AD-A162 039 FIRST ARTICLE QUALIFICATION TESTING CNU-399/E MAVERICK MISSILE CONTAINER(U) AIR FORCE PACKAGING EVALUATION AGENCY WRIGHT-PATTERSON AFB OH E J KOWALSKI OCT 85 1/1

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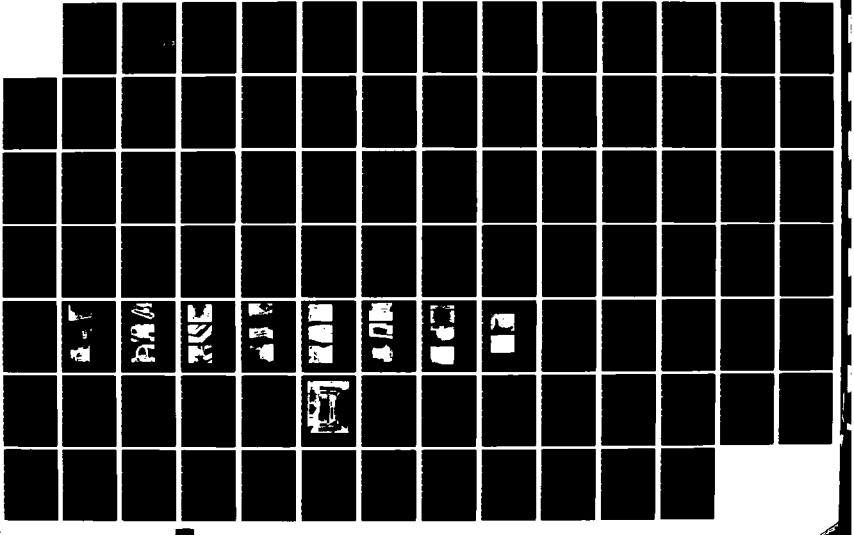

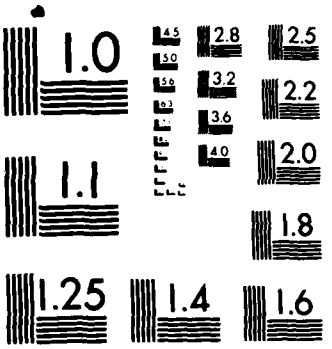

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Report No. 85-R-04
AFPEA Project No. 84-P-107

Edward J. Kowalski

Mechanical Engineer

AUTOVON 787-3362

Commercial (513) 257-3362

FIRST ARTICLE QUALIFICATION TESTING CNU-399/E MAVERICK MISSILE CONTAINER

HQ AFLC/DSTZ
AIR FORCE PACKAGING EVALUATION AGENCY
Wright-Patterson AFB OH 45433-5999

October 1985

AFPEA Project No. 84-P-107

TITLE: First Article Qualification Testing, CNU-399/E Maverick Missile Container

ABSTRACT

The Air Force Packaging Evaluation Agency (AFPEA), Wright-Patterson AFB OH was requested by ASD/TAM to conduct qualification testing on a production prototype CNU-399/E Maverick missile container.

Tests were conducted in accordance with Federal Test Method Standard (FTMS) No. 101, Military Standard 648 (MIL-STD-648) and Military Standard 810 (MIL-STD-810).

Attachment 2 is an interim report showing the results of inspection/testing on 21 containers Serial Nos. 1 through 19, (Note, serial numbers 83-0001 and 83-0002 were duplicated by the contractor) as received from the contractor Plastics Research Corporation, Ceritos CA, for qualification testing of the prototyping production unit. Results showed that these containers did not pass the required testing.

Results of the tests conducted on container Serial Nos. 83-0015, 83-0020, 83-0022, and 83-0023 showed that the containers have met all of the specification requirements. The production type CNU-399/E Maverick missile container will adequately protect the Maverick missile, AGM-65A/B/C/D/E/F all-up-round, and the Maverick missile less both the guidance unit and the hydraulic actuating system during transit and/or storage.

PREPARED BY:
EDWARD J. KOWALSKI
Mechanical Engineer
AFPEA

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REVIEWED BY:
RALPH ZYNDA
Chief, Design Branch
AF Packaging Evaluation Agency

APPROVED BY:
JACK E. THOMPSON
Chief, AF Packaging Evaluation Agency

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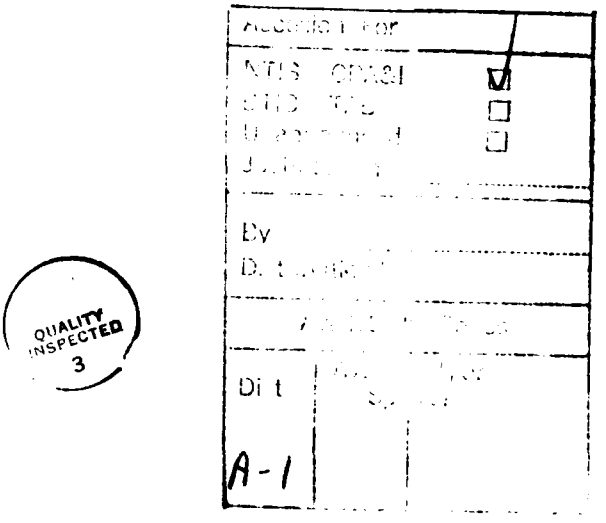


INTRODUCTION

BACKGROUND: Aeronautical System Division (ASD/TAM) Wright-Patterson AFB OH 45433-5999 requested assistance from the Air Force Packaging Agency (AFPEA) to perform a first article production qualification test on a new Maverick missile container. The prototype container was fabricated by a contractor and shipped to the AFPEA for testing.

PURPOSE: The purpose of this project was to determine if the prototype container CNU-399/E will protect its contents, the AGM-65A/B/C/D/E/F all-up-round (AUR) Maverick missile, during worldwide shipments, storage, and handling. The container will also be used for shipment, storage and handling of the missile less guidance unit (GU) and the missile less both GU and the hydraulic actuation system (HAS). The container was designed to limit the transmission of shock to a maximum of 40Gs.

TEST SPECIMENS: Two each CNU-399/E Maverick missile containers, Serial Nos. 83-0015 and 83-0020 (Figures 1 through 10), fabricated from fiberglass materials (resin transfer molded) under contract number F33657-83-C-2063, by Plastics Research Corporation, 13837 Bettencourt Street, Cerritos CA 90701, were used for the first article production qualification test. Two each CNU-399/E containers, Serial Nos. 83-0022 and 83-0023, were used for the water vapor permeability test.

TEST OUTLINE AND TEST EQUIPMENT

Tests were conducted in accordance with the AFPEA container test plan, Project No. 84-P-107, 10 May 84 (Table I). Test methods and procedures used were as outlined in Federal Test Method Standard (FTMS) No. 101, Military Standard 648, Military Standard 810, and ASTM Designation: D1008-64, Method A. Instrumentation and equipment used are annotated in each test procedure.

TEST PROCEDURES AND RESULTS

Inspection

Test No. 1: The containers, as received, were visually inspected. The exterior and interior surfaces, markings, hardware, cushioning, strapping and container seal were inspected for manufacturing imperfections. The containers were also checked for weight compliance and size.

Results: Results of the visual inspection are annotated in Tables II, III, IV, and V. Weight deviation from 350 to 380 pounds was obtained by the contractor from the systems project office (ASD/TAM). (This deviation was to be applied to the first 600 containers.) Weight of container, Serial No. 83-0020, was 408

pounds. Other container weights are as annotated on Tables II, IV, and V. The container dimensions were 110"Lx32"Wx29 11/16"H. On container, Serial No. 83-0020, slight flange distortion was noted on the cover section of the container also, and torque values were measured below 100 inch pounds on 12 tee-bolts. Better than average workmanship was noted on all four of the containers.

Leak Test

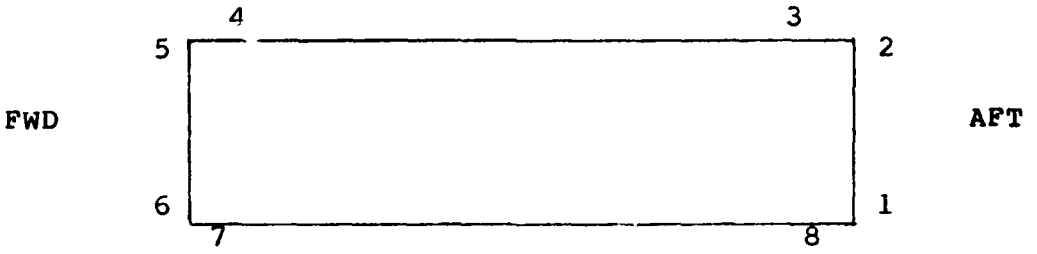
Test No. 2: An AGM-65/F inert Maverick missile all-up-round (AUR) total weight 670 pounds, was installed in the CNU-399/E container, Serial No. 83-0020 (Figure 11). This container test configuration was used for the production qualification test Nos. 1 through 20 and test Nos. 29 through 32. A Tri-axial accelerometer was mounted on the center of gravity of the missile, the container was closed, the tee-bolts were torqued to 100 inch pounds and a leak test was performed. The pneumatic pressure and vacuum retention tests were performed at 1.00 PSIG. The failure criteria for each test was 0.050 PSIG during a 60 minute period. A water manometer was used for all of the pneumatic pressure and vacuum retention tests in this qualification testing.

Results: At the end of the 60 minute pressure/vacuum leak test period, the results were as follows:

Pressure loss during leak test, 0.014 PSIG.

Vacuum loss during leak test, 0.038 PSIG.

The results of the tests are acceptable.



CNU-399/E Maverick missile container Serial No. 85-0020 Corner markings for reference in test data.

Rough Handling Tests

Test No. 3a: The cornerwise-drop (rotational) test was conducted in accordance with FTMS No. 101, Method 5005.1. The height of the drop was 20 inches.

Results: Visual inspection revealed damage to corner No. 3 (Figure 12) indicating a resin-rich area. A maximum of 19.8Cs was obtained during the tests. The results of the test are acceptable.

Test No. 3b: The edgewise-drop (rotational) test was conducted in accordance with FTMS No. 101, Method 5008.1. The height of the drop was 20 inches.

Results: Visual inspection revealed no damage to the container. A maximum of 16.6Gs was obtained during the test. The results of the test are acceptable.

Test No. 3c: The pendulum-impact test was conducted in accordance with FTMS No. 101, Method 5012. The impact velocity was 10 ft/sec, the drop height was 18.60 inches.

Results: Visual inspection revealed no damage to the container. A maximum of 20.2Gs was obtained during the tests. The results of the test are acceptable.

Test No. 3d: The stacked pendulum-impact test was conducted in accordance with MIL-STD-648, paragraph 5.2.7.1. For this test, the containers were stacked 2 high and banded (Figures 13 and 14). The impact velocity was 7 ft/sec, the drop height was 9.0 inches.

Results: Visual inspection revealed no damage to the containers. A maximum of 12.3Gs was obtained during the tests. The results of the test are acceptable.

Leak Test

Test No. 4: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.000 PSIG.

The result of the test is acceptable.

Vibration Fatigue Test

Test No. 5: The vibration fatigue test was conducted in accordance with MIL-STD-648, paragraph 5.3.2. The container was placed on the platen of a L.A.B. Division, Skaneateles NY 13152, Electro Hydraulic Vibration Exciter Model 41012, Serial No. 89003 and was rigidly attached to the exciter. A sinusodial vibration excitation was applied in a vertical direction and cyclically swept for 15 minutes at 2 minutes per octave from 5 to 12.5 Hz at 1.25 double amplitude and from 12.5 to 50.0 Hz at 1.0G. A 15

minute dwell test was conducted at the resonance frequency. The temperature of the cushion was monitored during the test.

Results: Visual inspection revealed no damage to the container. A maximum of 9.0Gs was obtained during the test. The maximum transmissibility obtained was 4.5. The maximum temperature was recorded at 82 degree fahrenheit. The results of the test are acceptable.

Leak Test

Test No. 6: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1 The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.000 PSIG.

The result of the test is acceptable

Repetitive Shock Test

Test No. 7a: The repetitive shock test was conducted in accordance with MIL-STD-648, paragraph 5.2.2 and FTMS No. 101, Method 5019.1. The container was placed on a L.A.B. Corporation, Skaneateles NY 13152, vibration test machine (LWVH), type 5000-96B, Serial No. 568.01. The container was placed on, but not fastened to the platform. Restraining blocks were attached to the platform to prevent the container from moving off the platform. A clearance of approximately 1/2 inch in all directions was used for the restraint blocks to allow free movement of the container during the 2-hour test period. With the container in position, the platform was vibrated at 3 to 5 Hz until the container raised from the platform (1/16 inch feeler gauge clearance between bottom of the container and platform), for a maximum platform acceleration of 1G.

Results: Visual inspection revealed no damage to the container. A maximum of 3.6Gs at 4.3Hz was obtained during the test. The results of the test are acceptable.

Test No. 7b: The repetitive shock test, with a superimposed load (stacked 3 high and banded, Figure 15), was conducted in accordance with MIL-STD-648, paragraph 5.2.2.1 and FTMS No. 101, Method 5019.1. The same procedure for testing the superimposed load was used as indicated in Test No. 7a.

Results: Visual inspection revealed no damage to the container. A maximum of 2.9Gs at 4.1Hz was obtained during the test. The results of the test are acceptable.

Leak Test

Test No. 8: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.009 PSIG.

The result of the test is acceptable.

Superimposed-Load Test

Test No. 9: The superimposed-load test was conducted in accordance with FTMS No. 101, Method 5016.1. The container was placed in a low temperature environmental chamber. A load of 11,030 pounds was equally distributed on the container (Figure 16), the temperature was stabilized at -40 degree fahrenheit (Chart No. 1) and the container remained at that temperature for one hour. The test was observed for deflection, permanent deformation, and structural failure of the container cover and base assembly. After the one-hour test and visual inspection was completed, the load was removed and the container was transferred to a high temperature/relative humidity environmental chamber. A load of 5,515 pounds was equally distributed on the container, the temperature was stabilized at +140 degree fahrenheit with a 90 percent relative humidity (Chart No. 2) and the test was continued for 168 hours. The test was observed for deflection, permanent deformation, and structural failure of the container.

Results: Visual inspection revealed excessive erosion of resin and the exposure of glass fibers on the container. Also, a 3/16 inch permanent set was obtained after the -40 degree fahrenheit superimposed-load test and an additional 1/8 inch permanent set was obtained after the +140 degree fahrenheit superimposed-load test. A total of 5/16 inch permanent set is recorded for the test. The results of the tests are acceptable.

Leak Test

Test No. 10: The penumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.000 PSIG.

The result of the test is acceptable.

High Temperature Test (+165 Degree Fahrenheit)

Test No. 11: The high temperature test was conducted in accordance with MIL-STD-810, Method 501.1, Procedure 1. The container was placed in a high temperature environmental chamber for a period of 24 hours at +165 degree fahrenheit (Chart No. 3). The test was observed for deflection, permanent deformation, and structural failure of the container.

Results: Visual inspeciton revealed no damage to the container. The results of the test are acceptable.

Leak Test

Test No. 12: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.011 PSIG

The result of the test is acceptable.

Rough Handling Test (High Temperature +140 Degree Fahrenheit)

Test No. 13a: The high temperature (Chart No. 4) Cornerwise-drop (rotational) test was conducted in accordance with FTMS No. 101, Method 5005.1. The height of the drop was 20 inches.

Results: Visual inspection revealed no damage to the container. A maximum of 9.8Gs was obtained during the tests. The results of the tests are acceptable.

Test No. 13b: The high temperature edgewise-drop (rotational) test was conducted in accordance with FTMS No. 101, Method 5008.1. The height of the drop was 20 inches.

Results: Visual inspection revealed no damage to the container. A maximum of 8.1Gs was obtained during the tests. The results of the tests are acceptable.

Test No. 13c: The high temperature pendulum-impact test was conducted in accordance with FTMS No. 101, Method 5012. The impact velocity was 10 ft/sec, the drop height was 18.60 inches.

Results: Visual inspection revealed no damage to the container. A maximum of 14.5Gs was obtained during the tests. The results of the test are acceptable.

Leak Test

Test No. 14: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.007 PSIG.

The result of the test is acceptable.

Low Temperature Test (-65 Degree Fahrenheit)

Test No. 15: The AGM-65/F inert Maverick missile all-up-round (AUR) total weight 670 pounds was removed from the test container and a light weight AGM-65A 297 pound inert Maverick missile less the guidance unit (GU) and the hydraulic actuation system (HAS) was installed in the test container (Figure 17). This container test configuration was used for the production qualification test Nos. 3 through 5 and test Nos. 15 through 19. A tri-axial accelerometer was mounted on the center of gravity of the missile. The container was closed, the tee bolts were torqued to 100 inch-pounds and the container was placed in a low temperature environmental chamber. The test was conducted in accordance with MIL-STD-810, Method 502.1, procedure 1 for a period of 24 hours at -65 degree fahrenheit (Chart No. 5). The test was observed for deflection, permanent deformation, and structural failure of the container.

Results: Visual inspection revealed no damage to the container. The results of the test are acceptable.

Leak Test

Test No. 16: The penumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.000 PSIG.

The result of the test is acceptable.

Rough Handling Tests (Low Temperature -40 Degree Fahrenheit)

Test No. 17a: The low temperature (Chart No. 6) cornerwise-drop (rotational) test was conducted in accordance with FTMS No. 101, Method 5005.1. The height of the drops was 20 inches.

Result: Visual inspection revealed no damage to the container. A maximum of 22.9Gs was obtained during the test. The results of the test are acceptable.

Test No. 17b: The low temperature edgewise-drop (rotational) test was conducted in accordance with FTMS No. 101, Method 5008.1. The height of the drops was 20 inches.

Result: Visual inspection revealed no damage to the container. A maximum of 21.8Gs was obtained during the tests. The results of the test are acceptable.

Test No. 17c: The low temperature (Chart No. 7) pendulum-impact was conducted in accordance with FTMS No. 101, Method 5012. The impact velocity was 10 ft/sec, the drop height was 18.60 inches.

Results: Visual inspection revealed no damage to the container. A maximum of 26.9Gs was obtained during the test. The rsults of the test are acceptable.

Leak Test

Test No. 18: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.007 PSIG.

The result of the test is acceptable.

Free Fall Drop Test

Test No. 19: A free fall flat drop test was conducted as follows: The container was suspended from a height of 18 inches and allowed to fall freely onto a concrete surface.

Results: Visual inspection revealed no damage to the container. A maximum of 32.1Gs was obtained during the test. The results of the test are acceptable.

Leak Test

Test No. 20: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.002 PSIG.

The result of the test is acceptable.

Rough Handling Test (Ambient Temperature)

Test No. 3a: The cornerwise-drop (rotational) test was conducted in accordance with FTMS No. 101, Method 5005.1. The height of the drop was 20 inches.

Results: Visual inspection revealed no further damage to the container. A maximum of 18.0Gs was obtained during the tests. The results of the test are acceptable.

Test No. 3b: The edgewise-drop (rotational) test was conducted in accordance with FTMS No. 101, Method 5008.1. The height of the drop was 20 inches.

Results: Visual inspection revealed no damage to the container. A maxiumum of 20.5Gs was obtained during the tests. The result of the test is acceptable.

Test No. 3c: The pendulum-impact test was conducted in accordance with FTMS No. 101, Method 5012. The impact velocity was 10 ft/sec, the drop height was 18.60 inches.

Results: Visual inspection revealed no damage to the container. A maximum of 29.4Gs was obtained during the tests. The result of the test is acceptable.

Leak Test

Test No. 4: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test the result was as follows:

Pressure loss during leak test, 0.007 PSIG.

The result of the test is acceptable.

Vibration Fatigue Test

Test No. 5: The vibration fatigue test was conducted in accordance with MIL-STD-648, paragraph 5.3.2. The method of testing was the same as outlined in test No. 5 with the heaviest AUR (Page 3).

Results: Visual inspection revealed no damage to the container. A maximum of 8.8Gs was obtained during the test. The maxiumum transmissibility obtained was 4.9. The maximum temperature was recorded at 89 degree fahrenheit. The results of the test are acceptable.

Leak Test

Test No. 6: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test the result was as follows:

Pressure loss during leak test, 0.000 PSIG.

The result of the test is acceptable.

NOTE: Container Serial No. 83-0015 was used for the first article production qualification tests numbers 21 through 28. These tests were conducted with the heaviest all-up-round, AGM-65/F inert Maverick Missile, 670 pound.

Rough Handling Test

Test No. 21a: The mechanical forklift handling test was

conducted in accordance with FTMS No. 101, Method 5011.1, para 6.2. The test was conducted with the heaviest AUR with one container and repeated with containers stacked two high (Figure 18) and three high.

Results: Visual inspection revealed no damage to the container. The result of the test is acceptable.

Test No. 21b: The pushing test was conducted in accordance with FTMS No. 101, Method 5011.1, para 6.5.

Results: Visual inspection revealed no damage to the container. The result of the test is acceptable.

Test No. 21c: The pull test was conducted in accordance with FTMS No. 101, Method 5011.1, Para 6.6.

Results: Visual inspection revealed no damage to the container. The result of the test is acceptable.

Leak Test

Test No. 22: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test the result was as follows:

Pressure loss during leak test, 0.011 PSIG.

The result of the test is acceptable.

Hoisting Strength Test

Test No. 23: The hoisting strength test was conducted in accordance with MIL-STD-648, para 4.17.3.1 and 5.8.1. The container was loaded with a 3,235 pound load and was hoisted by the attachments used in transporting with the HLU 216/E weapon cradle hoist beam and was left hanging for one hour. The container was then loaded with the heaviest AUR and was hoisted by one lift point and left hanging for one hour. The container was then loaded with 5,400 pounds (Figure 19) and hoisted by all lifting points simultaneously and left hanging for an additional one hour.

Results: Visual inspection revealed no damage to the container or to the lift/tie-down points. The results of the test are acceptable.

Leak Test

Test No. 24: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.004 PSIG.

The result of the test is acceptable.

Tie-Down Strength Test

Test No. 25: The tie-down strength test was conducted in accordance with MIL-STD-648, para 4.17.4 and 5.8.2. The test was performed at the Flight Dynamics Laboratory, Air Force Wright Aeronautical Laboratories, Wright-Patterson AFB OH 45433.

Results: Visual inspection revealed no damage to the container. Procedure and results of the test are listed in the AFWAL-TM-85-206-FIBT Report (Atch 1).

The result of the test is acceptable.

Leak Test

Test No. 26: The pneumatic pressure test was conducted in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria was 0.013 PSIG during a 15 minute period.

Results: At the end of the 15 minute pressure test, the result was as follows:

Pressure loss during leak test, 0.007 PSIG.

The result of the test is acceptable.

Cover Handle Pull Test

Test No. 27: A calibrated scale was used to measure the 500 pound pull applied to the cover handle pull test. The load was applied from several different angles to compensate for various methods of lifting the cover assembly.

Results: Visual inspection revealed no physical damage to the handles or cover of the test container. The results of the test are acceptable.

Leak Test

Test No. 28: The pneumatic pressure and vacuum tests were performed in accordance with FTMS No. 101, Method 5009.1. The container was placed in a high temperature environmental chamber at +140 degree fahrenheit for a period of 24 hours. The pneumatic pressure and vacuum retention tests were performed at 1.00 PSIG. The failure criteria was 0.050 PSIG during a period of 60 minutes. The container was then placed in a low temperature environmental chamber at -40 degree fahrenheit for a period of 24 hours. The failure criteria and test period was the same as used for the high temperature test.

Results: At the end of the 60 minute pressure/vacuum test period, +140 degree fahrenheit, the results were as follows:

Pressure loss during leak test, 0.022 PSIG.

Vacuum loss during leak test, 0.023 PSIG.

At the end of the 60 minute pressure/vacuum test period, -40 degree fahrenheit, the results were as follows:

Pressure loss during leak test, 0.047 PSIG.

Vacuum loss during leak test, 0.033 PSIG.

The results of the tests are acceptable.

Container Pressure Test

Test No. 29: The container pressure test was conducted in accordance with MIL-STD-648, para 5.5.2. The container was pressurized to 1.00 PSIG and allowed to stabilize. The pressure was then increased by 0.25 PSIG every five minutes until the blow-out plug (desiccant port cover) released itself from the container. The test was also observed for deflection, permanent deformation, and structural failure of the container.

Results: Visual inspection revealed no damage to the container. The blow-out plug released itself at 1.75 PSIG in 12 minutes. The result of the test is acceptable. (Note: The blow-out plug was reinstalled and the container pressure-tested with favorable results.)

Surface Charge Dissipation Test

Test No. 30: The surface charge dissipation test was conducted in accordance with FTMS No. 101, Method 4046. The test

was conducted in a relative humidity-controlled chamber of 20 percent. Two samples size 3"x6" of the container specimen were used for the test. The surface discharge shall be less than 1.0 sec.

Results: The results of the test are as follows:

Sample No	Decay Rate (sec) Positive	Negative
1	0.03	0.03
1	0.03	0.04
1	0.03	0.03
Average	0.03	0.03
2	0.03	0.03
2	0.03	0.03
2	0.04	0.04
Average	0.03	0.03

The results of the test are acceptable.

Conductive Path Test

Test No. 31: The conductive path test was performed by checking the DC OHM resistance from each terminating and breaking point from the missile skin to the external ground. The conductor path test shall not be greater than 0.1 DC OHM resistance.

Results: The conductive path test measured 0.070 DC OHM resistance. Results of the test are acceptable.

Fire Resistance Test

Test No. 32: The fire resistance test was conducted in accordance with MIL-STD-648, para 5.11. The containers were stacked two high simulating a shipping condition. A flame was applied to the skin of the lower container, for a period of five minutes, by a propane torch.

Results: Visual inspection indicated a charred surface (Figures 20 and 21). The fiberglass material did not support combustion when the flame was removed from the container at the end of the five minute test period. No damage was observed to the upper container. Results of the test are acceptable.

Watervapor Permeability Test

Test No. 33: Two containers, Serial Nos. 83-0022 and 83-0023, were used for this test. The containers were visually inspected. The exterior and interior surfaces, markings, hardware, cushioning, strapping, and container seal were inspected for manufacturing imperfections. The containers were also checked for weight compliance. A pneumatic pressure and vacuum retention test was performed on each container in accordance with FTMS No. 101, Method 5009.1. The test was performed at 1.00 PSIG. The failure criteria for the test was 0.050 PSIG during a 60 minute period. The watervapor permeability test was conducted in accordance with FTMS No. 101, Method 5021, and ASTM 1008-64, Method A. Trays fabricated from plastic material were filled with anhydrous calcuim chloride, weighed and installed in the containers. The amount of anhydrous calcium chloride was calculated at 10 percent of the total exposed area of the container. The depth of the anhydrous calcium chloride was a minimum of 1/2 inch in each tray. The test was conducted at 100 degree fahrenheit and 95 percent relative humidity for a period of 30 days (charts 8 through 12). The allowable water vapor permeability requirement shall be no more than 0.050 grams/100 square inch/24 hours (254 grams for the total test period of 30 days).

Results: Results of the visual inspection are annotated in Tables IV and V. At the end of the 60 minutes pressure/vacuum test period, the results were as follows:

Container Serial No. 83-0022
Pressure loss during leak test, 0.004 PSIG
Vacuum loss during leak test, 0.018 PSIG

Container Serial No. 83-0023
Pressure loss during leak test, 0.011 PSIG
Vacuum loss during leak test, 0.031 PSIG

The water vapor permeability calculated at the end of the 30-day test was:

Serial No. 83-0022, 100 grams for a 30-day test period.
Serial No. 83-0023, 106 grams for a 30-day test period.

The results of the tests are acceptable.

CONCLUSION:

1. Twenty-one containers (seven sets) were furnished by the contractor before a container was qualified and accepted by the Air Force for production. Results of the 21 container tests (Serial Nos. 83-0001 through 83-0019) are annotated in Atch 2,

CNU-399/E Maverick Missile Container Interim Qualification Test Results, dated 16 May 1985 and revised 18 July 1985.

2. Results of the tests completed, 1 through 33 of the container test plan, AFPEA Project No. 84-P-107, indicate that the container has met all of the specification requirements. Engineering change proposals, Nos. 0006, 0007, 0008, and 0010, should be incorporated into the design to enhance the container's performance in the field. A selective test plan should be developed and prototypes tested to verify the changes incorporated.

3. Container Serial No. 83-0020 used for the production qualification tests was modified by the contractor from the original design by adding one extra tee-bolt on each side of the container, redesigning the cushioning system, adding and then replacing the nylon straps with dacron straps, redesigning the stacking indices, and adding additional fibers and resin, as required, for structural strength, also the weight of the container was raised from 350 pounds to 408 pounds.

4. Engineering change proposals were suggested to redesign the cover lift handles (Figure 22) and the tie-down rings (Figure 23), these changes have been added on containers Serial Nos. 83-0022 and 83-0023. These containers were used for the watervapor permeability test with favorable results.

5. Excessive weathering of the container was noted as a result of the container in outdoor storage in direct sunlight and the result of the 168 hour +100 degree fahrenheit and 90 percent RH superimposed-load test No. 9. Much of the resin had excessive erosion and exposed the fiberglass fibers. Although this is a higher than normal temperature, it should be noted that a possible safety problem exists to personnel handling the container with the exposed fibers.

6. It was found that torquing of tee-bolts to 100-inch pounds was required. Flattening of washers to indicate closure of the container was not a reliable method.

7. Pages 14 through 18 of the container test plan have been omitted from this report and will be issued in the technical report for the certification test requirements.

RECOMMENDATION:

1. To maintain a product that will give proper protection to its contents, the AGM-65 Maverick missile, a good quality control program must be established to maintain the integrity of this container throughout production design/fabrication.

2. Since the original weight of the container was raised from 350 pounds maximum to 408 pounds maximum, this weight should be maintained for the structural strength of the container.

3. Level 3 Drawings should correspond to the dimensions of container Serial No. 83-0020 and these drawings should be used/ maintained in the fabrication/production of all CNU-399/E Maverick Missile containers.

4. One container from the first production lot, produced by the contractor, should be sent to AFPEA for limited production testing to verify the container design and the contractors quality control program. This is especially critical if the container weight drops more than five percent below 408 pounds.

TABLE I

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)				AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION
Fiberglass Construction

CONDITIONING
As noted in test plan

TEST NO.	REF STD SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRU-MENTATION
1.	WEIGHT TEST			
	*(4.2.2.1.16)	Weight Test - Weight should not be greater than 350 pounds.	Fully assembled container including shock vibration system and straps.	Scale
2.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic Pressure, 1.00 PSI Vacuum Pressure, 1.00 PSI Leakage must be less than 0.050 PSI per hour. Test duration to be a minimum of 60 minutes.	Test at ambient condition from compressed air supply/vacuum pump.	Water Manometer
3.	ROUGH HANDLING TESTS (AMBIENT TEMPERATURE)			
a.	Fed-Std-101 Method 5005.1 (4.2.2.1.1)	Cornerwise - Drop (Rotational) Test, drop height 20 inches.	One drop on each bottom corner, total of 4 drops, each configuration. Test: 1. w/heaviest all-up-round (AUR) 2. Lightest all-up-round w/o guidance unit (GU), and Hydraulic Actuating System (HAS).	Tri-axial accelerometer placed at the item center-of-gravity with axes sensitivity directed in the longitudinal, vertical and transverse direction.
b.	Fed-Std-101 Method 5008.1 (4.2.2.1.1)	Edgewise-Drop (Rotational) Test, drop height 20 inches.	One drop on each bottom edge, total of 4 drops, each configuration.	Tri-axial accelerometer

COMMENTS NOTE: * Figures in parenthesis ( ) refer to paragraphs in Spec No. CON319-1310 of contract F2263?-84-C-2063.

PREPARED BY
EDWARD J. KOWALSKI, Mech Engr, AFPEA

APPROVED BY
RALPH [illegible], Chief, Division Branch, AFPEA

AFALD [illegible] 4

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84
ITEM NAME: AGM-65 Maverick Missile		MANUFACTURER: Plastics Research Corp, Cerritos CA 90701				
CONTAINER NAME: CNU-399/E				CONTAINER COST: N/A		
PACK DESCRIPTION: Fiberglass Construction						
CONDITIONING: As noted in test plan						

TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRUMENTATION
			Test: 1. w/heaviest AUR 2. Lightest AUR, w/o GU & HAS.	
c.	Fed-Std-101 Method 5012 (4.2.2.1.1)	Pendulum-Impact Test, impact velocity 10 ft/sec, drop height 18.60 inches.	One impact on each side and each end, total of 4 impacts. Test: 1. w/heaviest AUR 2. Lightest AUR w/o GU & HAS.	Tri-axial accelerometer
d.	Mil-Std-648 Para 5.2.7.1 (4.2.2.1.1.1)	Stacked Pendulum-Impact Test, impact velocity 7 ft/sec. drop height 9.0 inches. Banding of containers shall be through the banding reliefs provided on the container.	* Stacked 2 high and banded, one impact on each end , and on each side, total of 4 impacts. Test: 1. w/heaviest AUR	Tri-axial accelerometer
4.	LEAK TEST Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic Pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes. 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
5.	VIBRATION FATIGUE TEST Mil-Std-648	Vibration Test for Fatigue.	Rigidly attach	Thermocouple

COMMENTS *Revised 11 March 1985, per ltr, ASD/TAM, 5 March 1985.

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr.	RALPH ZYNDA, Chief, Design Br, AFPEA

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROS :	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION

Fiberglass Construction

CONDITIONING

As noted in test plan

TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRUMENTATION
	Para 5.3.2 (4.2.2.1.2)	Input excitation of 0.125 inch double amplitude or 1G, whichever is less. Sweep, approximately logarithmically from 5 to 50 Hz over 5 minutes -0/+5 minutes (about 1/2 octave/min) for 15 minutes. A 15 minute dwell test at the resonance frequency. The test may be interrupted to prevent excessive temperature rise in materials.	container to exciter Test: 1. w/heaviest AUR 2. Lightest AUR, w/o GU & HAS	Tri-axial Accelerometer
6.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic Pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
7.	REPETITIVE SHOCK			
	Mil-Std-648 Para 5.2.2 and Fed-Std-101 Method 5019.1 (4.2.2.1.3)	Repetitive Shock Test, test at 3 to 5 Hz or 1G whichever is less. Test for not less than 2 hours.	Test: 1. w/heaviest AUR	Tri-axial accelerometer
	Mil-Std-648 Para 5.2.2.1 (4.2.2.1.4)	Repetitive Shock Test with Superimposed Load, test at 3 to 5 Hz or 1G whichever is less, test for not less than 2 hours.	Stack 3 high, test bottom container.	Tri-axial accelerometer

COMMENTS

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr	RALPH ZYNDA, Chief, Design Br, AFPEA

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)				AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84
ITEM NAME: AGM-65 Maverick Missile		MANUFACTURER: Plastics Research Corp, Cerritos CA 90701				
CONTAINER NAME: CNU-399/E		CONTAINER COST: N/A				
PACK DESCRIPTION: Fiberglass Construction						
CONDITIONING: As noted in test plan						

TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRU-MENTATION
		Banding of containers shall be through the banding reliefs provided.	Test: 1. w/heaviest AUR	
8.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes. 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
9.	SUPERIMPOSED LOAD			
	Fed-Std-101 Method 5016.1 (4.2.2.1.9)	Superimposed-Load Test, stack five high or 16 ft whichever is greater. Load equals load on bottom container times a factor of safety of 2, leave stacked for 1 hour at -40°F. Repeat at +140°F and 90% relative humidity with a safety factor of 1 and leave for 168 hours.	Bottom container is container under test. Test: 1. w/heaviest AUR	Record changes, i.e., buckling deformations.
10.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic Pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes. 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer

COMMENTS

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr	RALPH ZYNDA, Chief, Design Br, AFPEA

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84
ITEM NAME AGM-65 Maverick Missile		MANUFACTURER Plastics Research Corp, Cerritos CA 90701				
CONTAINER NAME CNU-399/E				CONTAINER COST N/A		
PACK DESCRIPTION Fiberglass Construction						
CONDITIONING As noted in test plan						

TEST NO.	REF STD SPEC AND TEST METHOD OR PROCEDURE NOs	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRU-MENTATION
11.	HIGH TEMPERATURE TEST (+165°F)			
	Mil-Std-810 Method 501.1 Procedure I (1.2.2.1.5)	High temperature test, T=165°F for not less than 24 hours. Check for permanent deformation when temperature is taken down to ambient.	Place in high temperature chamber Test: 1. w/heaviest AUR.	
12.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (1.2.2.1.13)	Leak Test: Pneumatic pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes. 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
13.	ROUGH HANDLING TESTS (HIGH TEMPERATURE +140°F)			
a.	Fed-Std-101 Method 5005.1 (4.2.2...7)	High Temperature Cornerwise-drop (Rotational) Test, heat in chamber +140°F for not less than 24 hours, drop height 20 inches.	*Test is performed in heat chamber, one drop on diagonal bottom corners, total of 2 drops. Test: 1. w/heaviest AUR.	Tri-axial accelerometer
b.	Fed-Std-101 Method 5008.1 (4.2.2...7)	High Temperature Edgewise-drop (Rotational) Test, heat in chamber +140°F for not less than 24 hours, drop height 20 inches.	**One drop to two bottom edges, total of 2 drops.	Tri-axial accelerometer

COMMENTS NOTE: * Remaining corner drops to be effected at Test No. 17a.
** Remaining edge drops to be effected at Test No. 17b.

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr	RALPH ZYNDA, Chief, Design Br, AFPEA

AFALD [illegible] 4

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)				AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR: / EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION
Fiberglass Construction

CONDITIONING
As noted in test plan

TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRUMENTATION
			Test: 1. w/heaviest AUR.	
c.	Fed-Std-101 Method 5012 (4.2.2.1.7)	*High Temperature Pendulum-Impact Test, heat in chamber +165°F for period not less than 6 hrs temperature of shock mitigation system at time of test shall be +140°F (±5°F). Impact velocity 10 ft/sec, drop from 18.60 inches. (See page 6A for for additions)	One impact on each side and each end total of 4 impacts Test: 1. w/heaviest AUR.	Tri-axial accelerometer Thermocouples
14.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic Pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
15.	LOW TEMPERATURE TEST (-65°F)			
	Mil-Std-810 Method 502.1, Procedure 1 (4.2.2.1.6)	Low Temperature Test, T= -65°F for not less than 24 hours, check for deformation when container is taken to room temperature.	Place in low temperature chamber. Test: 1. Lightest AUR, w/o GU & HAS.	
16.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic Pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI	Water Manometer

COMMENTS *Revised 11 Mar 1985, per ltr, ASL/TAM, 5 March 1985

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr	RALPH ZYNDA, Chief, Design Br, AFPEA

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER
					84-P-107
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY: 3 / DATE: Revised 10 May 84
ITEM NAME: AGM-65 Maverick Missile		MANUFACTURER: Plastics Research Corp, Cerritos CA 90701			
CONTAINER NAME: CNU-399/E		CONTAINER COST: N/A			

PACK DESCRIPTION

Fiberglass Construction

CONDITIONING

As noted in test plan

TEST NO.	REF STD SPEC AND TEST METHOD OR PROCEDURE NOs	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRU-MENTATION
c.		(Continued from page 6 of 18. Test shall be completed within 10 minutes or until cushion temperature falls outside of the $\pm 5^{o}$F test temperature. If test not completed within 10 minutes, container shall be returned to chamber for not less than 4 hours for reconditioning.		

COMMENTS

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr, AFPEA	RALPH ZYNDA, Chief, Design Br, AFPEA

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/P	N/A

PACK DESCRIPTION
Fiberglass Construction

CONDITIONING
As noted in test plan

TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRUMENTATION
			2. Test duration to be 15 minutes. 3. Leakage must be less than 0.013 PSI per 15 minutes.	
17.	ROUGH HANDLING TESTS (LOW TEMPERATURE -40°F)			
a.	Fed-Std-101 Method 5005.1 (4.2.2.1.8)	Low Temperature Cornerwise-drop (Rotational) Test, T= -40°F for not less than 24 hours, drop height 20 inches.	**Test in chamber one drop on each diagonal bottom corners, total of 2 drops. Test: 1. Lightest AUR w/o GU & HAS	Tri-axial accelerometer
b.	Fed-Std-101 Method 5008.1 (4.2.2.1.8)	Low Temperature Edgewise-Drop (Rotational) Test, T= -40°F for not less than 24 hours, drop height 20 inches.	**Test in chamber one drop on two bottom edges, total of 2 drops. Test: 1. Lightest AUR w/o GU & HAS	Tri-axial accelerometer
c.	Fed-Std-101 Method 5012 (4.2.2.1.3)	Low Temperature Pendulum-Impact Test, T= -65°F for not less than 8 hours, temperature of shock mitigation system at time of test shall be -40°F (±5°F). Impact velocity 10 ft/sec. Drop height 18.6 inches. (See page 8A for addition).	One impact on each side and each end, total of 4 impacts. Test: 1. Lightest AUR, w/o GU & HAS	Tri-axial accelerometer Thermocouples

COMMENTS NOTE: ** These corners/edges are opposite those impacted during high temperature test.
* Revised 11 March 1985, per ltr, ASD/TAM, 5 March 1985

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr.	RALPH ZYNDA, Chief, Design Br, AFPEA

AFALD [illegible] 4

AIR FORCE PACKAGING EVALUATION AGENCY
(Container Test Plan)

AFPEA PROJECT NUMBER: 84-P-107

CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY	DATE
					3	Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION: Fiberglass Construction

CONDITIONING: As noted in test plan

TEST NO	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRU-MENTATION
c.		Continued from page 7 of 18 Test shall be completed within 10 minutes or until cushion temperature falls outside of the -5^{+0} F test temperature. If test not completed within 10 minutes, container shall be returned to chamber for not less than 4 hours for recon-ditioning.		

COMMENTS

PREPARED BY: Edward L. Kowalski, Mech Engr, AFPEA

APPROVED BY: RALPH ZYNDA, Chief, Design Branch, AFPEA

AFALD 4

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION
Fiberglass Construction

CONDITIONING
As noted in test plan

TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRUMENTATION
18.	LEAK TEST Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic Pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes. 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
19.	FREE FALL DROP TEST (4.2.2.1.10)	Free Fall Flat Drop Test, drop height 18 inches.	One drop on bottom Test: 1. Lightest AUR, w/o GU & HAS.	Tri-axial accelerometer
20.	LEAK TEST Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes. 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
21.	ROUGH HANDLING TEST Fed-Std-101 Method 5011.1 Para 6.2, 6.5 & 6.6 (4.2.2.1.11)	Mechanical Handling Test Para 6.2 - Forklift Handling Test. Lift container(s) off ground with tines inclined 15° and stack restrained to prevent	One container; then repeat with 2 stacked, then with 3 stacked.	N/A

COMMENTS

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr	RALPH ZYNDA, Chief, Design Br., AFPEA

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION

Fiberglass Construction

CONDITIONING

As noted in test plan

TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRUMENTATION
		sliding, carry 100 ft in 23 Sec. (30 ft from the start, square to the path will be two parallel 2x4s 54 inches apart. At 60 ft from the start, 2 parallel 2x4s will be placed at a 60° angle so that the left wheel strikes first. At 90 ft from the start, place 2 more 2x4s at a 75° angle so that the right wheel strikes first). During and after completing the 100 ft carry observe container(s) for damage. Record observation and lower the container(s) to the ground. Record observations. Para 6.5 - Pushing. The fork-lift tines should extend under but not support the container. Push on hard surface 35 ft in 85 seconds. Para 6.6 - Pull by towing rings 100 ft in 23 seconds and repeat sideways.	Test: 1. w/heaviest AUR.	

COMMENTS

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr	RALPH ZYNDA, Chief, Design Br., APPEA

AIR FORCE PACKAGING EVALUATION AGENCY
(Container Test Plan)

AFPEA PROJECT NUMBER: 84-P-107

CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY	DATE
					3	Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION

Fiberglass Construction

CONDITIONING

As noted in test plan

TEST NO.	REF STD SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRU-MENTATION
22.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic pressure .00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
23.	HOISTING STRENGTH TEST			
	Mil-Std-648 Para 4.17.3.1 & 5.8.1 (4.2.2.1.12)	Hoisting Test, container loaded to 3 times gross weight. Hoist with the HLU 216/E weapon cradle hoist beam and leave hanging for 1 hour. Hoist loaded container at one lift point and leave hanging for one hour. Hoist one container loaded to 5 times gross weight by all lift points simultaneously and leave hanging for 1 hour. Legs of the sling should be greater than 30° from the horizontal. Rings should be at least 2½ inches diameter.	Test: 1. w/heaviest AUR.	
24.	LEAK TEST			
	Fed-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer

COMMENTS

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr	RALPH ZYNDA, Chief, Design Br., AFPEA

AFALD [illegible] 4

AIR FORCE PACKAGING EVALUATION AGENCY
(Container Test Plan)

AFPEA PROJECT NUMBER: 84-P-107

CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY	DATE
					3	Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION
Fiberglass Construction

CONDITIONING
As noted in test plan

TEST NO.	REF STD/SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRUMENTATION
25.	TIE-DOWN STRENGTH TEST			
	Mil-Std-648 Para 4.17.4 & 5.8.2 (4.2.2.1.12)	Tie-down attachments must be compatible with aircraft floors (cap. 10,000 lbs with 20 inch centers), the following load will be applied for 1 minute each:	Test: 1. w/heaviest AUR.	
	MIL-A-8421 Para 3.3.4	*Forward 3 x gross weight *Aft 1-1/2 x gross weight *Lateral 1-1/2 x gross weight **Down 4 1/2 x gross weight **Up 2 x gross weight.	Test: 1. w/heaviest AUR.	
26.	LEAK TEST			
	Mil-Std-101 Method 5009.1 (4.2.2.1.13)	Leak Test: Pneumatic pressure 1.00 PSI	1. Pressure Test only to 1.00 PSI 2. Test duration to be 15 minutes. 3. Leakage must be less than 0.013 PSI per 15 minutes.	Water Manometer
27.	COVER HANDLE PULL TEST			
	(4.2.2.1.19)	Cover Handle Pull Test, pull 500 lbs in every direction that service loads are possible check for permanent deformation.	1. w/heaviest AUR.	Scale
28.	LEAK TEST			
	Fed-Std-101	Leaks in Container, repeat		Water

COMMENTS
* Use 2 rings
** Use 4 rings

PREPARED BY	APPROVED BY
Edward J. Kowalski, Mech Engr.	RALPH LYNDA, Chief, Design Br., AFPEA

AFALD [illegible] 4

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER 84-P-107	
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84
ITEM NAME: AGM-65 Maverick Missile		MANUFACTURER: Plastics Research Corp, Cerritos CA 90701				
CONTAINER NAME: CNU-39?/E		CONTAINER COST: N/A				
PACK DESCRIPTION: Fiberglass Construction						
CONDITIONING: As noted in test plan						

TEST NO.	REF STD SPEC AND TEST METHOD OR PROCEDURE NO's	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRUMENTATION
	Method 5009.1 (4.2.2.1.14)	test #2 with T= +140°F for not less than 24 hrs and for T = -40°F for not less than 24 hours. Test duration to be a minimum of 60 minutes.		Manometer
29.	CONTAINER PRESSURE TEST			
	MIL-STD-648 Para 5.5.2 4.2.2.1.18)	Pressure test container to 3.50 PSI, check for excessive deformation, failure, or any other unsafe condition.	Pressurize Container to 1.00 PSI. Increase pressure by 0.25 PSI every 5 minutes to a maximum of 3.50 PSI. NOTE: Blow-out plug should function prior to or at 3.50 PSI.	Pressure gage
30.	SURFACE CHARGE DISSIPATION TEST			
	Fed-Std-101 Method 4046 (4.2.2.1.15.2)	* Surface Charge Dissipation Test, relative humidity less than 20%, 3" X 3" material samples furnished by contractor.		Static decay meter
31.	CONDUCTIVE PATH TEST			
	(4.2.2.1.15.1)	Conductive Path Test, not greater than 0.1 OHM DC resistance from each terminating and breaking point from the missile skin to an external ground.		Ohmmeter
32.	FIRE RESISTANCE TEST			
	Mil-Std-648	Fire Resistance Test, (tempera-	Place in simulated	Blow torch

COMMENTS *Revised 11 March 1985, per ltr, ASD/TAM, 5 March 1985

PREPARED BY	APPROVED BY
Ed J. Kowalski, Mech Engr.	RALPH ZYNDA, Chief, Design Br, AFPEA

AIR FORCE PACKAGING EVALUATION AGENCY (Container Test Plan)					AFPEA PROJECT NUMBER 84-P-107
CONTAINER SIZE (L X W X D)(INCHES) INTERIOR:	EXTERIOR:	WEIGHT (LBS) GROSS:	ITEM:	CUBE (CU. FT.)	QUANTITY 3	DATE Revised 10 May 84

ITEM NAME	MANUFACTURER
AGM-65 Maverick Missile	Plastics Research Corp, Cerritos CA 90701

CONTAINER NAME	CONTAINER COST
CNU-399/E	N/A

PACK DESCRIPTION

Fiberglass Construction

CONDITIONING

As noted in test plan

TEST NO.	REF STD SPEC AND TEST METHOD OR PROCEDURE NOs	TEST TITLE AND PARAMETERS	CONTAINER ORIENTATION	INSTRU-MENTATION
	Para 5.2.1 (4.2...1.1.1)	ture, smoke, toxicity shall not be monitored) place torch on bottom sections for 5 minutes at a time, the container should not ignite the upper container and the flame should extinguish after removal of the ignition source.	environmental for shipping (stack two high) Test: 1. w/heaviest AUR.	
13.	WATER VAPOR PERMEABILITY TEST			
	Fed-Std-101 Method 5041 Para 5041.2 Method A (5.3.1)	Temperature +100°F (±2°F) and 90% (±2%) relative humidity for 96 hours. Water vapor permeability shall be no more than 0.05 grams/100 sq in/24 hrs.	Place two test containers in high temperature humidity chamber.	
	Para 5.2.1 (4.2...1.1.1)	The container shall limit transmission of shocks to the contents to a maximum of 60 gravitational forces. This attenuation shall be attained throughout the temperature range -65°F to +140°F, and/or as noted in the test plan.		

COMMENTS

PREPARED BY	APPROVED BY
Edward J. Fowlkes, Mech Engr	PAUL ZYNDA, Chief, Design Br, AFPEA

TABLE II

Visual Inspection

Requirement	Accept	Reject	Remarks
Weight pounds			
Base Section/Cover Section			
Forklift Pockets			
	X X		
Stacking Interface			
Hoisting/Tie-Down Provisions			
Desiccant Port			
Humidity Indicator			
Pressure Equalizing Valve			
Electrical Grounding Connector			
Records Receptacle			
Security Seal			
Weldments			
Identification/Markings			
Human Performance			
Closure Hardware			
Container Seal			
Cushioning			
Strapping			
Workmanship			

TABLE III

Visual Inspection

CNU-399/E Maverick Missile Container Serial No.
83-0020

Requirement		Accept	Reject	Remarks
Container Weight pounds	Total - 350			408#
	Base Section - 200			223#
	Cover - 150			185#
Base Section/Cover Section		X		
Forklift Pockets		X		
Flange	Base Section	X		
	Cover Section			Slight Flange Distortion
Stacking Interface		X		
Hoisting/Tie-Down Provisions		X		
Desiccant Port		X		
Humidity Indicator		X		
Pressure Equalizing Valve		X		
Electrical Grounding Connector		X		
Records Receptacle		X		
Security Seal		X		Provisions made in flange area for a lock wire seal.
Weldments				
Identification/Markings		X		
Human Performance				
Closure Hardware				12 Tee-bolts, torqued valve below 100"# one tee-bolt added for side
Container Seal		X		
Cushioning		X		Cushion laminated from 2,4,& 6 lb density.
Strapping		X		Nylon straps replaced w/Dacron straps.
Workmanship		X		

TABLE IV

Visual Inspection

CNU-399/E Maverick Missile Container Serial No. 83-0022

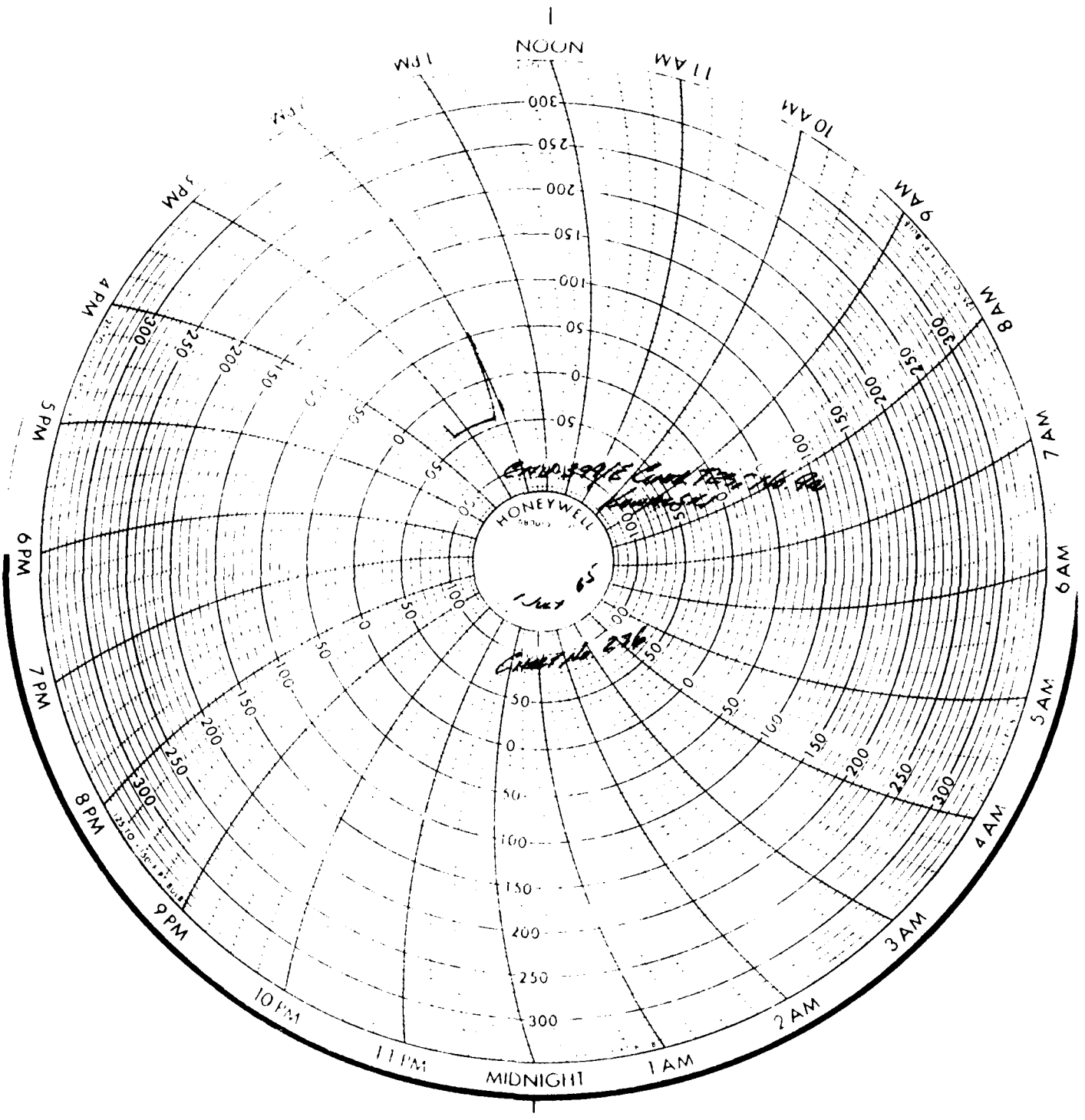
Requirement		Accept	Reject	Remarks
Container Weight pounds	Total - 350#			364#
	Base Section - 200#			207#
	Cover - 150#			157#
Base Section/Cover Section		X		
Forklift Pockets		X		
Flange	Base Section	X		
	Cover Section	X		
Stacking Interface		X		
Hoisting/Tie-Down Provisions		X		ECP (Fig 22 & 23) Added
Desiccant Port		X		
Humidity Indicator		X		
Pressure Equalizing Valve		X		
Electrical Grounding Connector		X		
Records Receptacle		X		
Security Seal		X		
Weldments				
Identification/Markings		X		
Human Performance				
Closure Hardware				
Container Seal		X		
Cushioning		X		
Strapping		X		
Workmanship		X		

TABLE V

Visual Inspection

CNU-399/E Maverick Missile Container Serial No.
83-0023

Requirement		Accept	Reject	Remarks
Container Weight pounds	Total - 350#			373#
	Base Section - 200#			216#
	Cover - 150#			157#
Base Section/Cover Section		X		
Forklift Pockets		X		
Flange	Base Section	X		
	Cover Section	X		
Stacking Interface		X		
Hoisting/Tie-Down Provisions		X		ECP (Figure 22 & 23) Added
Desiccant Port		X		
Humidity Indicator		X		
Pressure Equalizing Valve		X		
Electrical Grounding Connector		X		
Records Receptacle		X		
Security Seal		X		
Weldments				
Identification/Markings		X		
Human Performance				
Closure Hardware				
Container Seal		X		
Cushioning		X		
Strapping		X		
Workmanship		X		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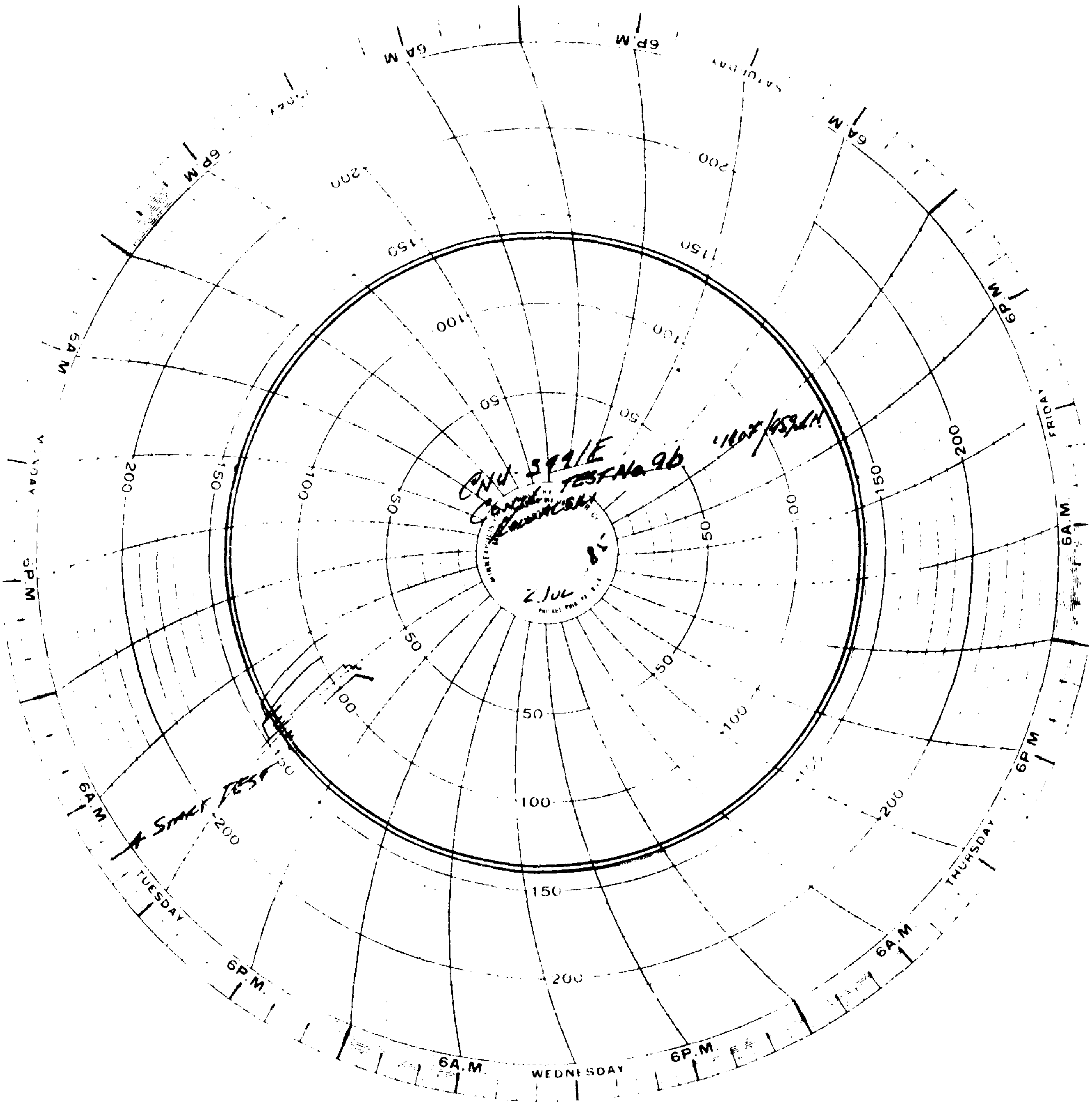
11 AM
10 AM
9 AM
8 AM
7 AM
6 AM
5 AM
4 AM
3 AM
2 AM
1 AM
MIDNIGHT
11 PM
10 PM
9 PM
8 PM
7 PM
6 PM
5 PM
4 PM
3 PM
HONEYWELL
300
250
200
150
100
50
0
50
100
150
200
250
300

CHART 1



6A.M
6P.M
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WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
50
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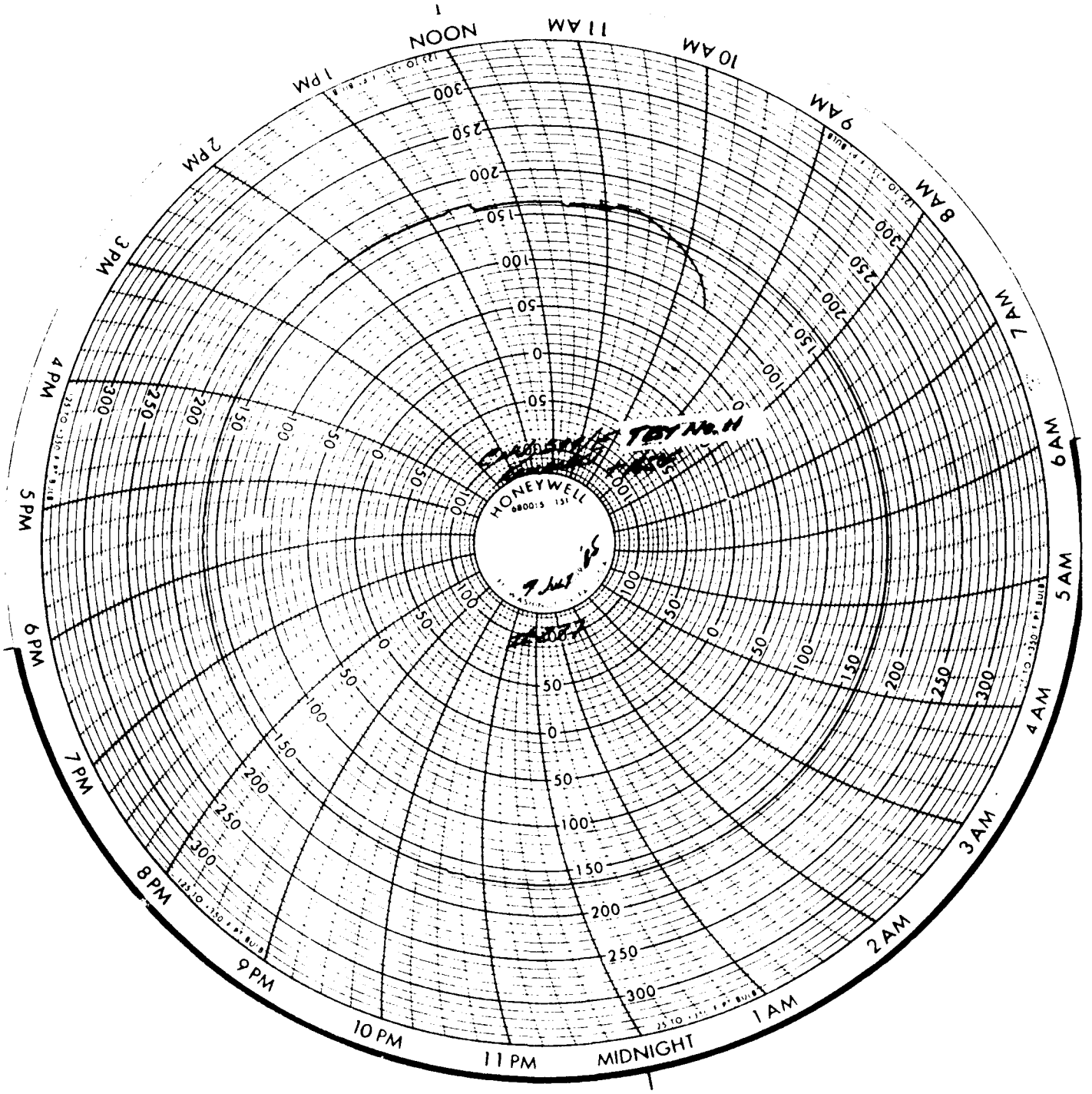
150
200
Start Test
2 JUL

CHART 2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MIDNIGHT
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8 PM
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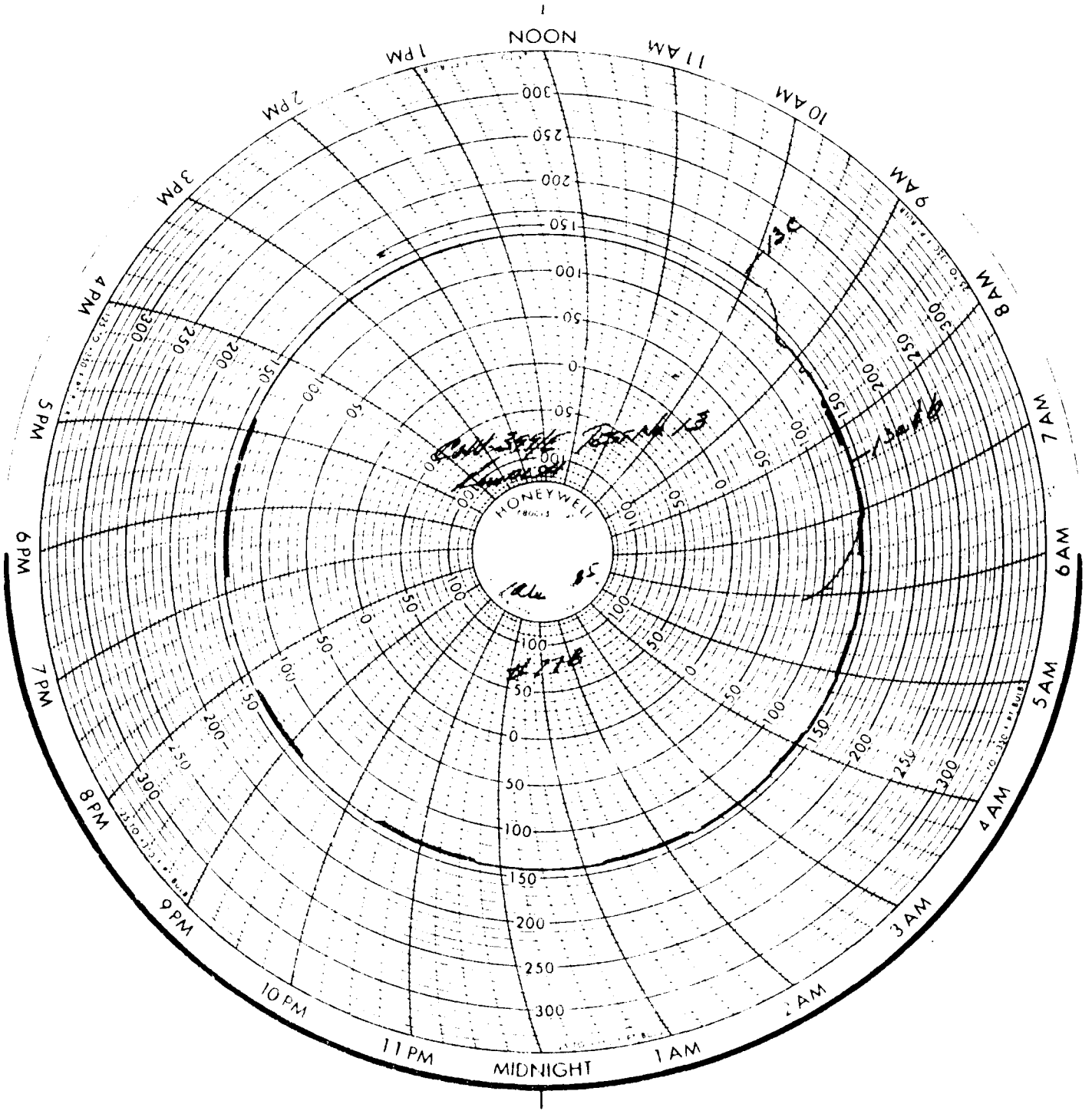
4 PM
3 PM
2 PM
1 PM
HONEYWELL
0
50
100
150
200
250
300

CHART 3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5 AM
6 AM
7 AM
8 AM
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10 AM
11 AM
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200
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100
50
0
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100
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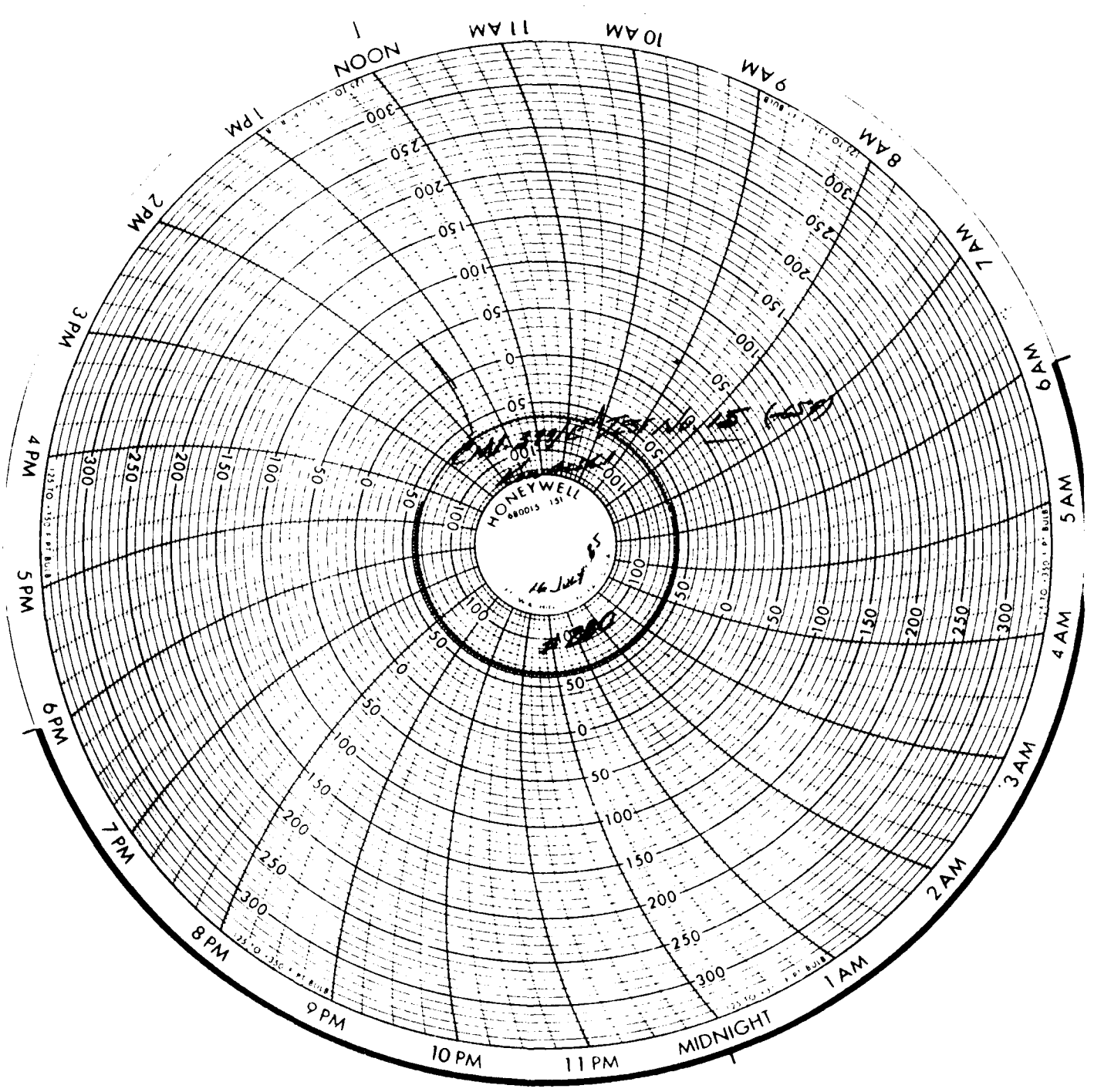
200
250
300

CHART 4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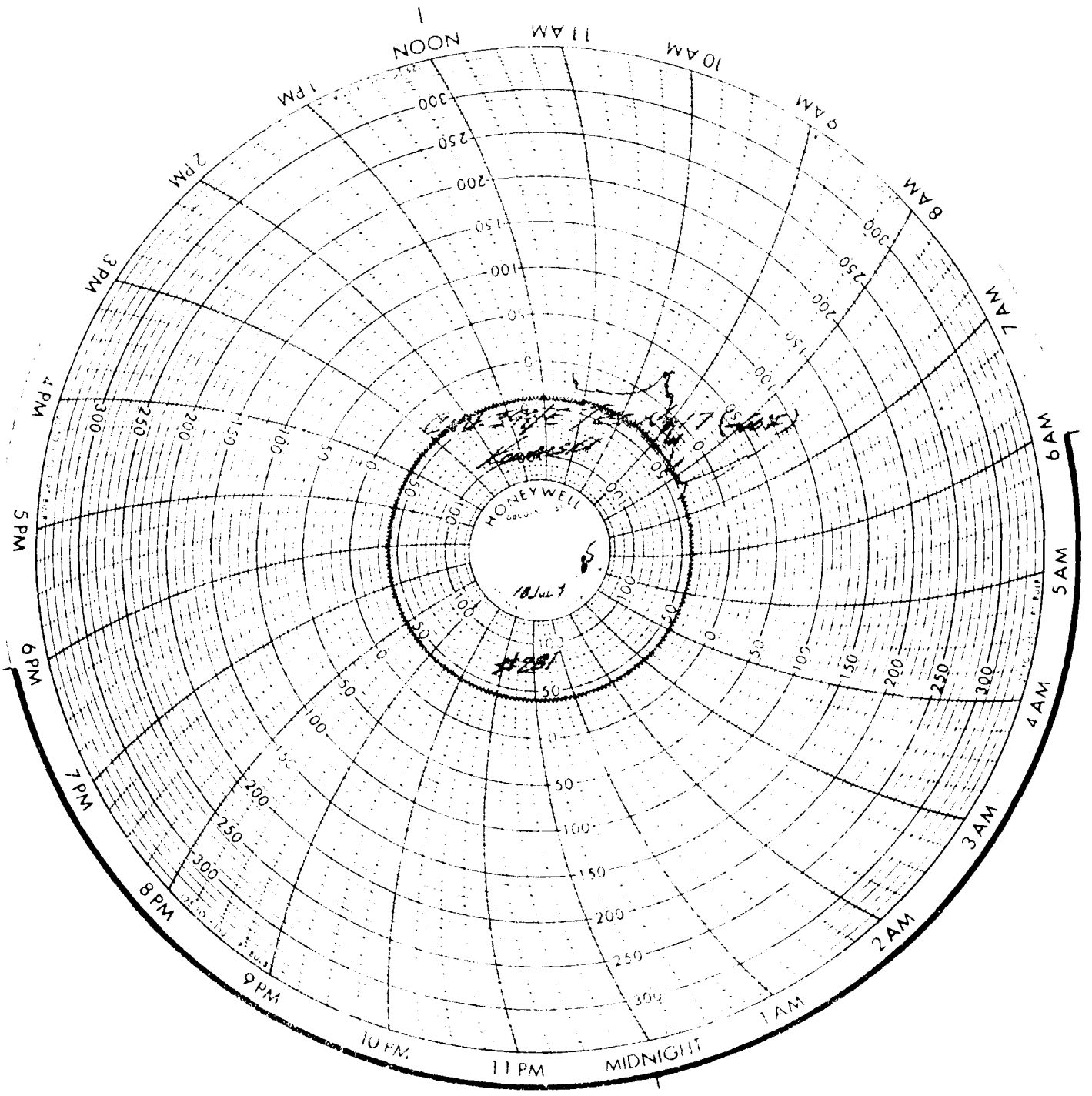
11 AM
HONEYWELL

CHART 5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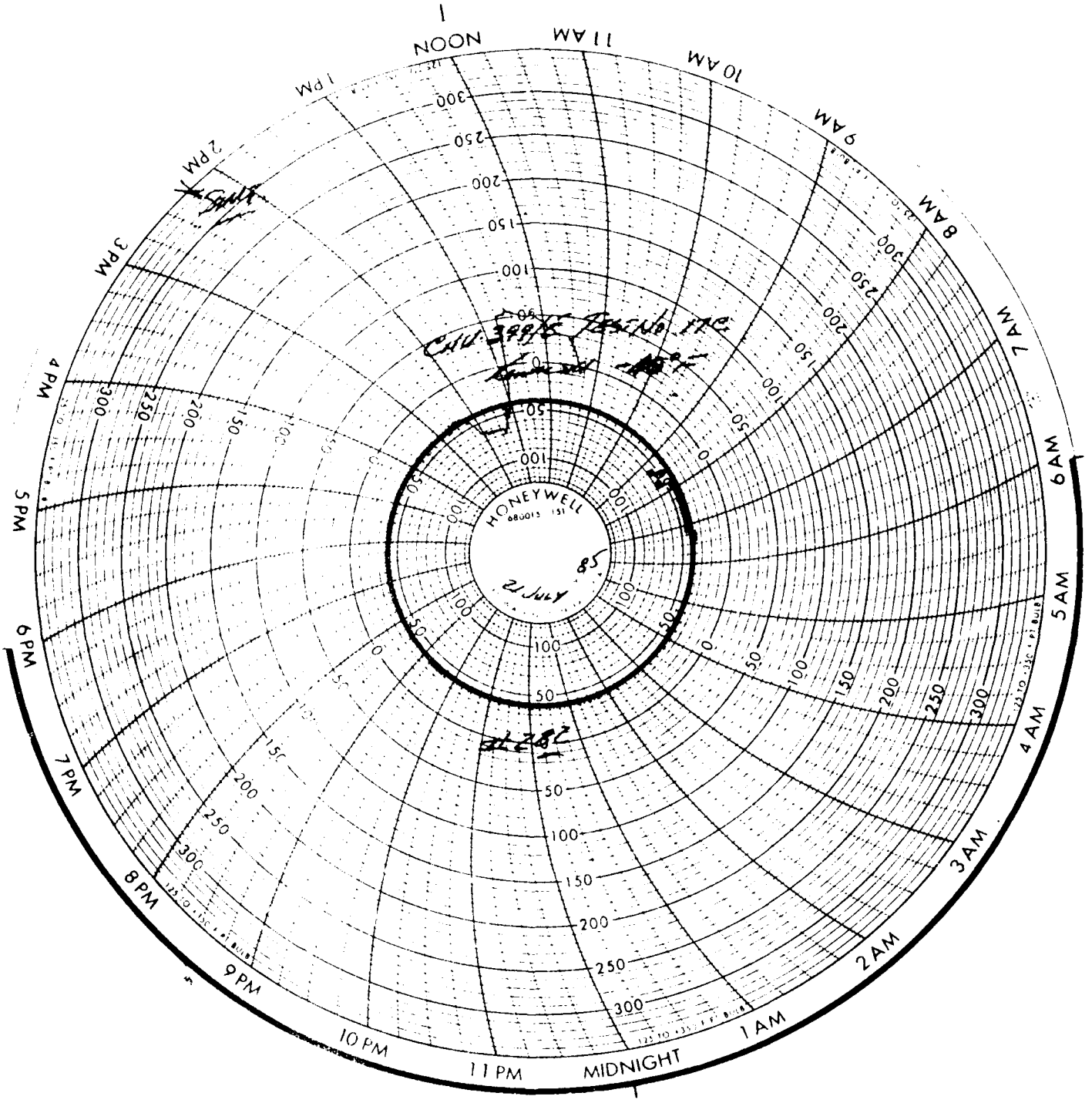
1 PM
HONEYWELL

CHART 6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2 AM
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MIDNIGHT
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10 PM
9 PM
8 PM
7 PM
6 PM
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1 PM
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250
300
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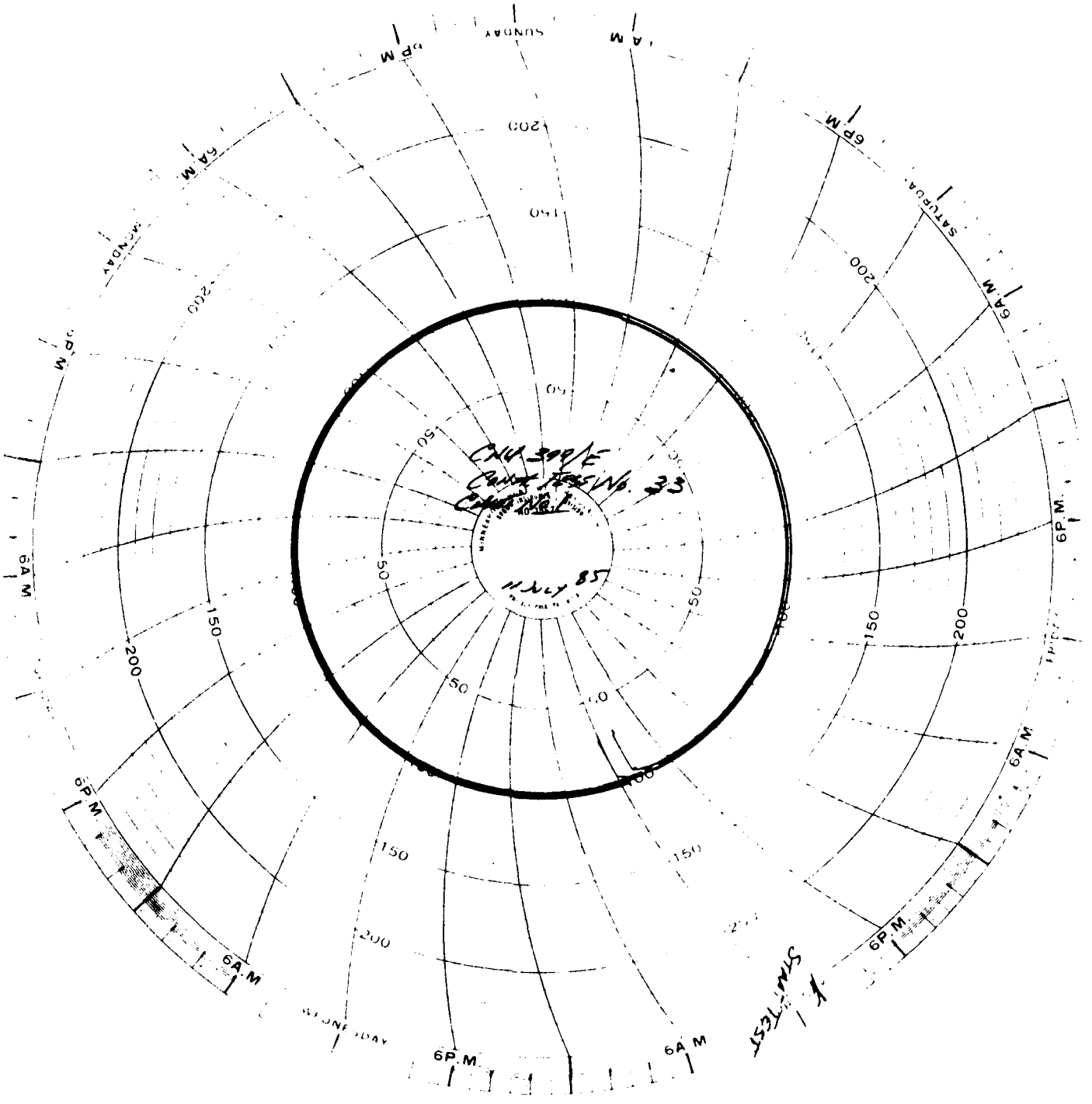

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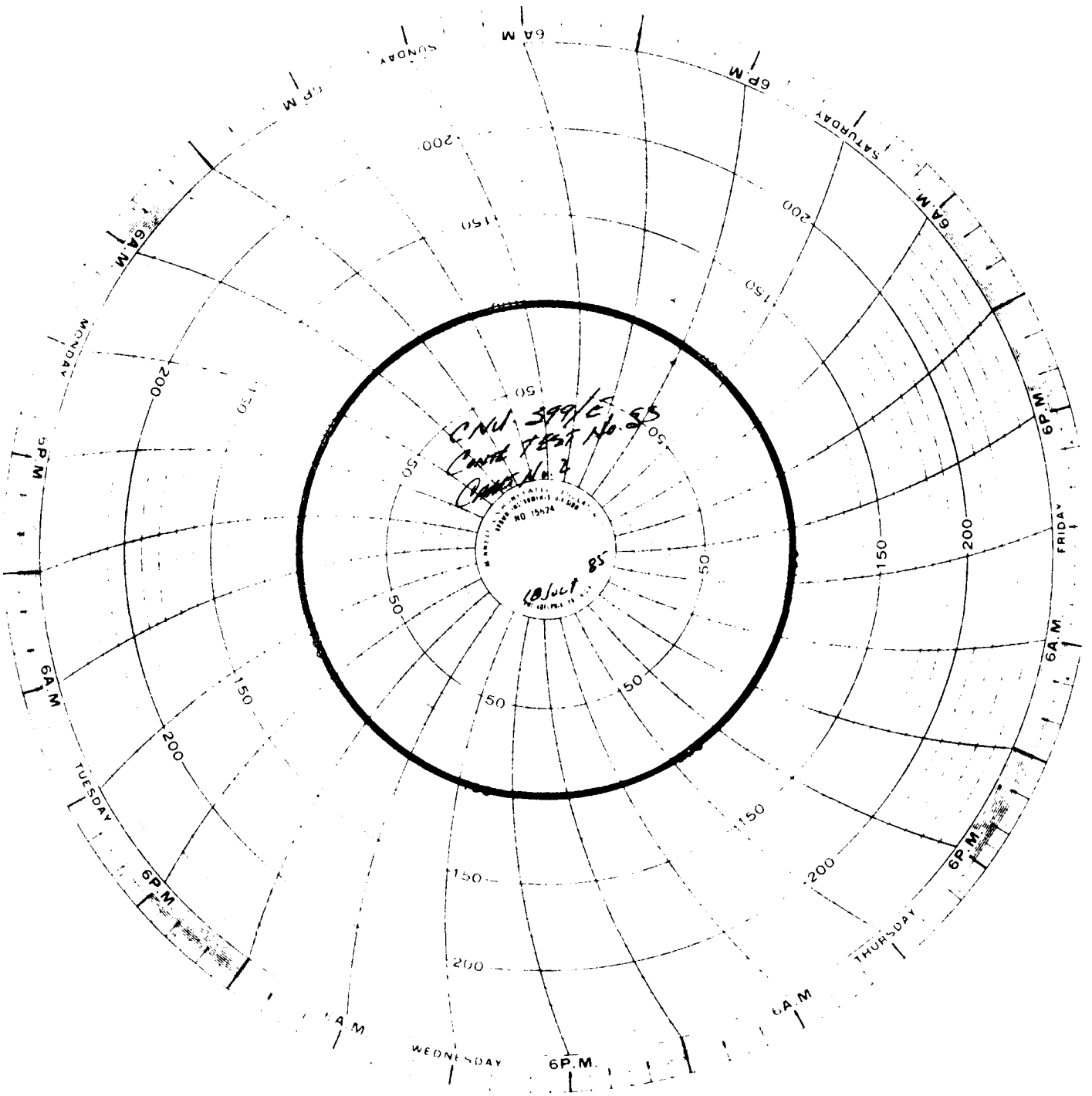
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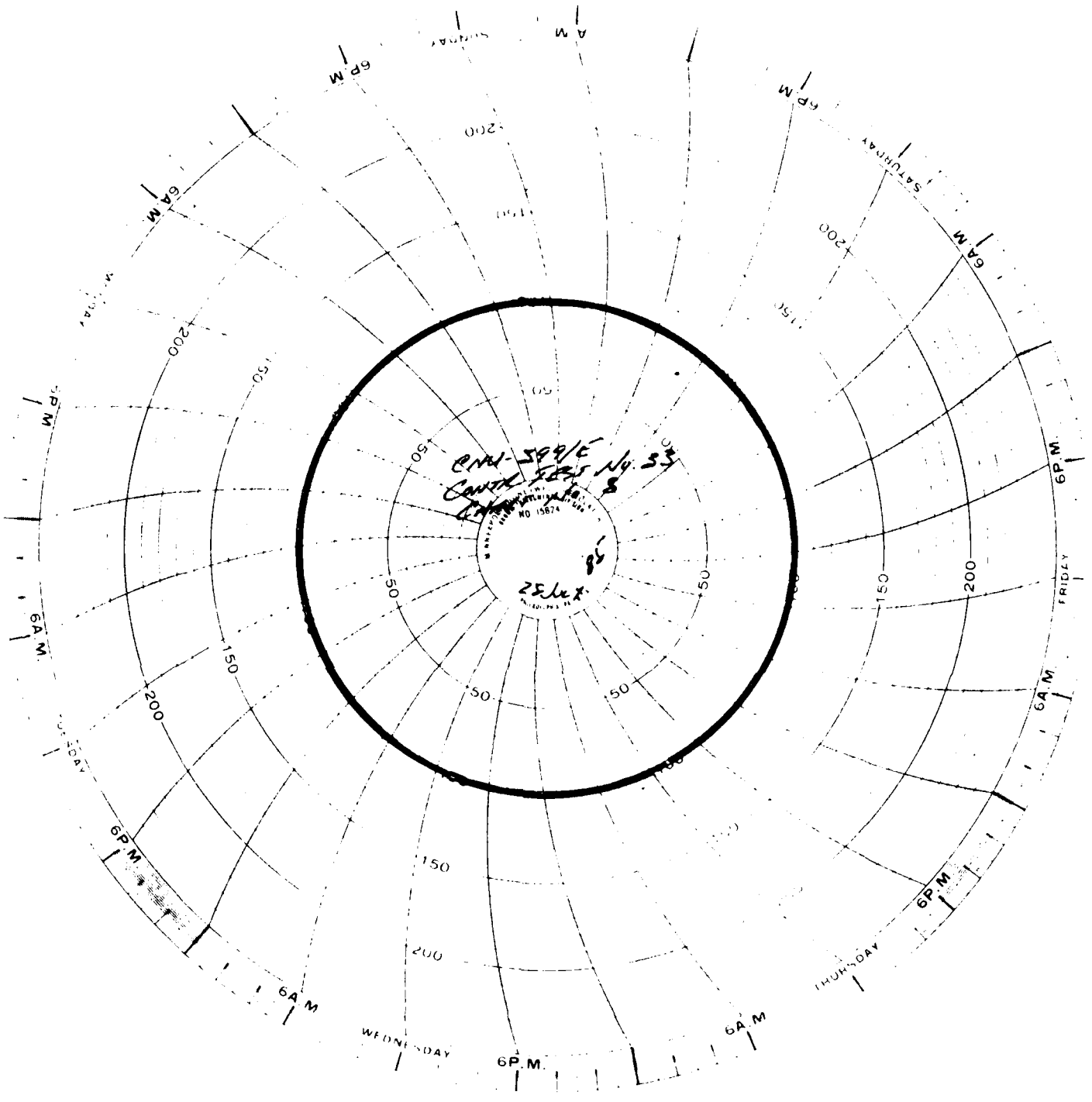
6A.M
6P.M
SATURDAY
FRIDAY
THURSDAY
WEDNESDAY
TUESDAY
MONDAY
50
150
200
CNU 399/EA
Comm Test No. 85
10 JULY 85

CHART 9



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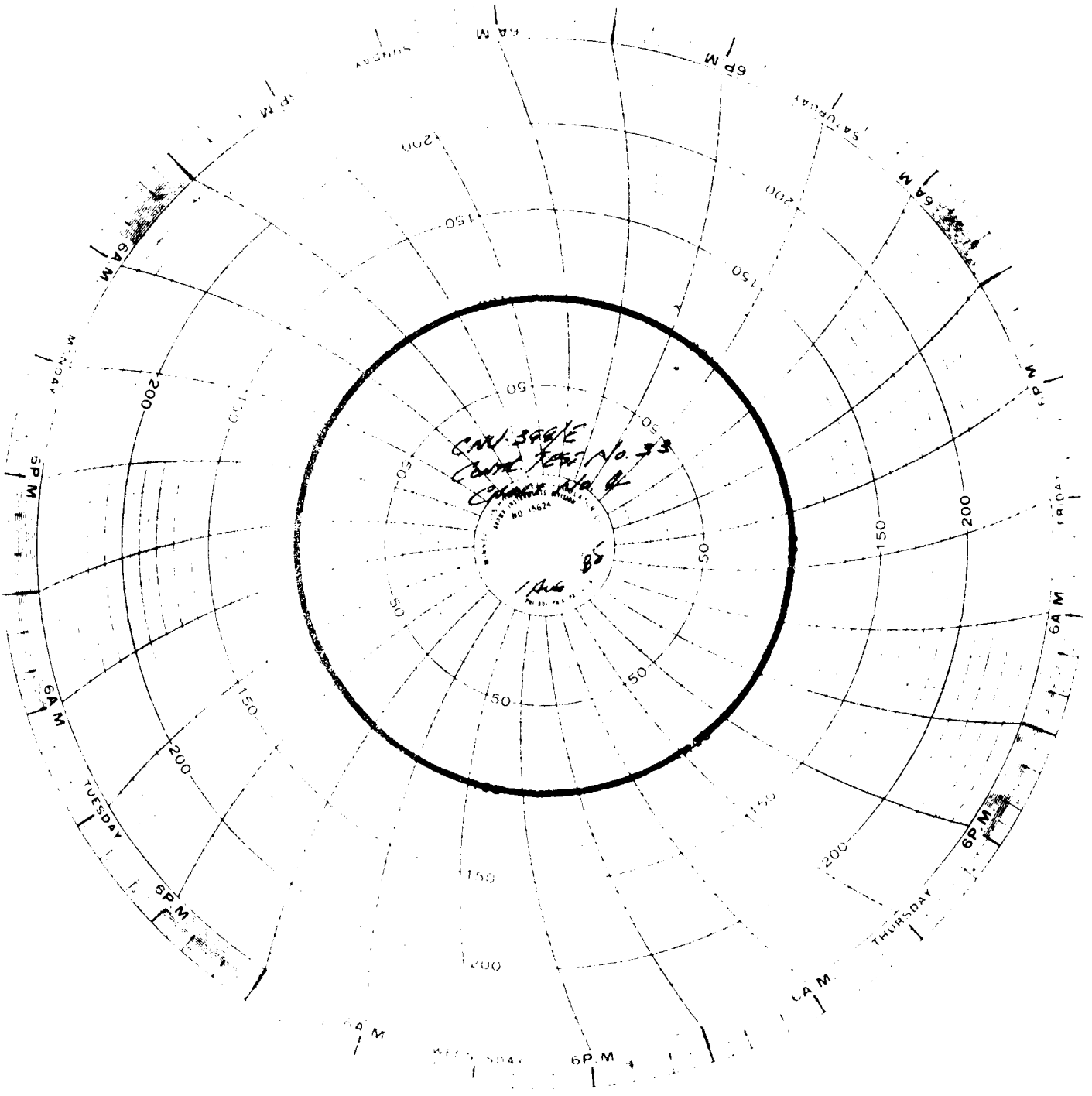
50
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6A M
6P M
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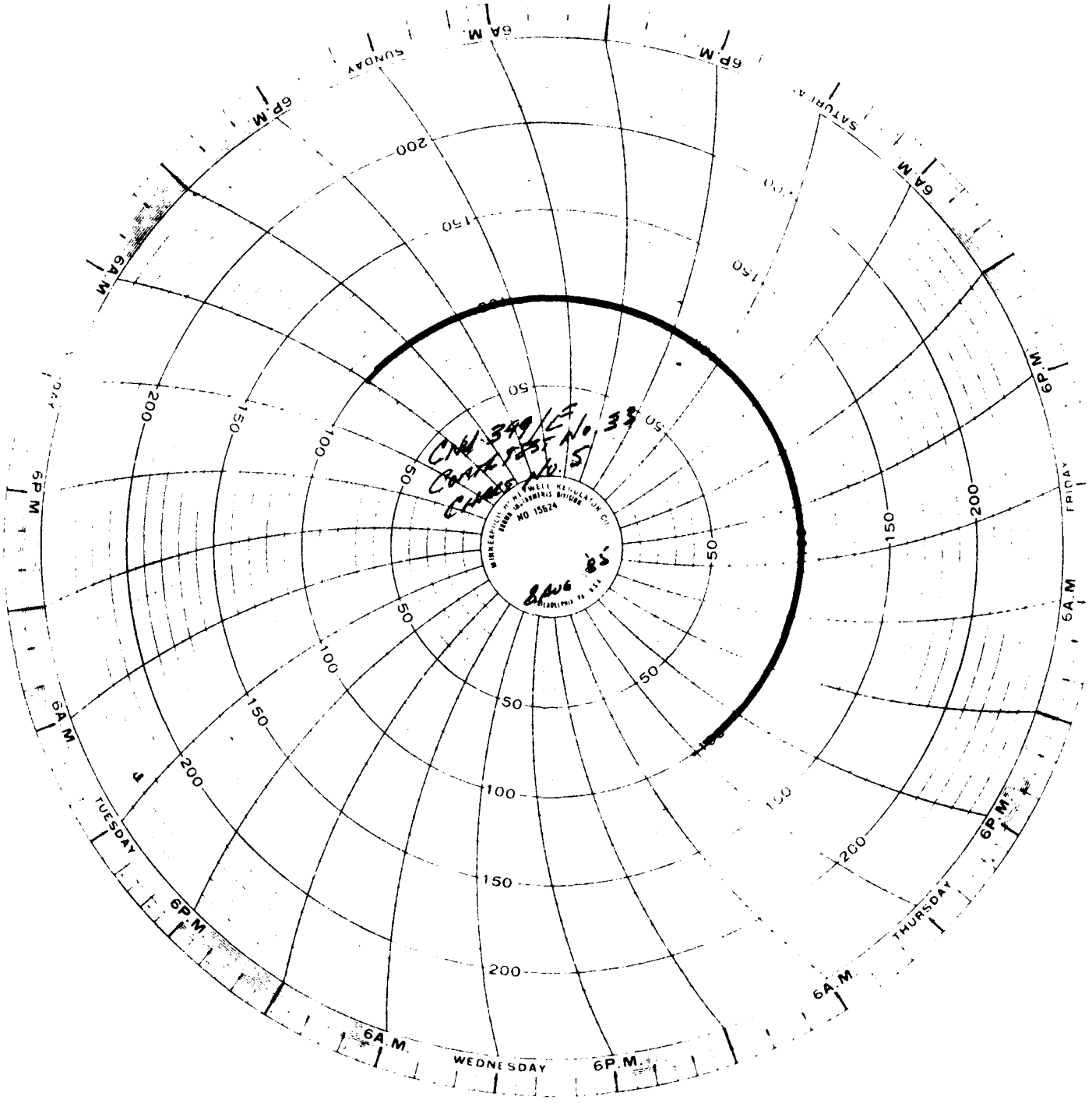
THURSDAY
FRIDAY
SATURDAY
SUNDAY
MONDAY
WEDNESDAY

CHART 11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TUESDAY
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FRIDAY
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200
NO 15624

CHART 12

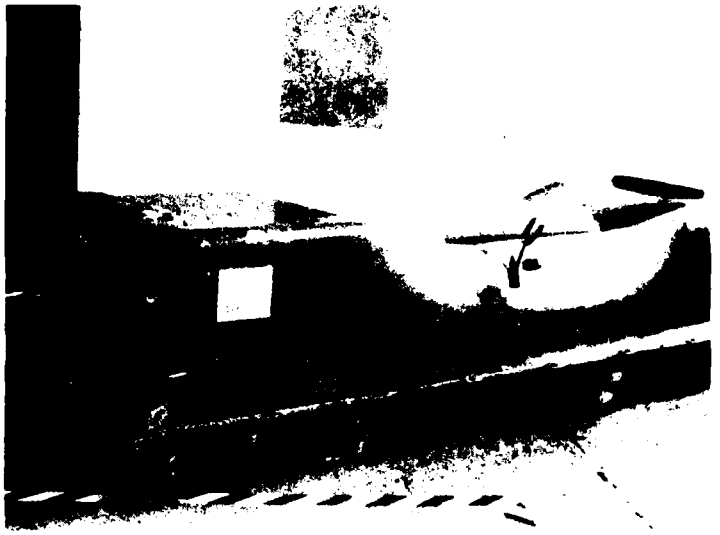


Figure 1, CNU-399/E Maverick Missile Container, Side View

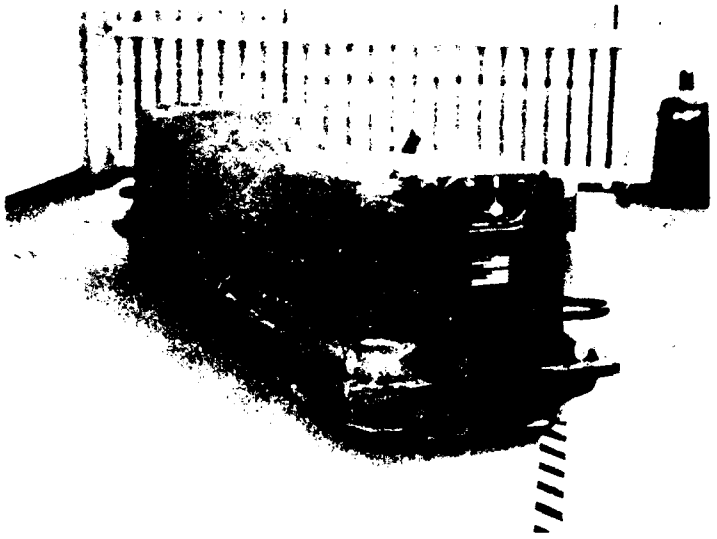


Figure 2, CNU-399/E Maverick Missile Container, Aft End View

Figure 3, CNU-399/E Maverick Missile Container, Forward End View

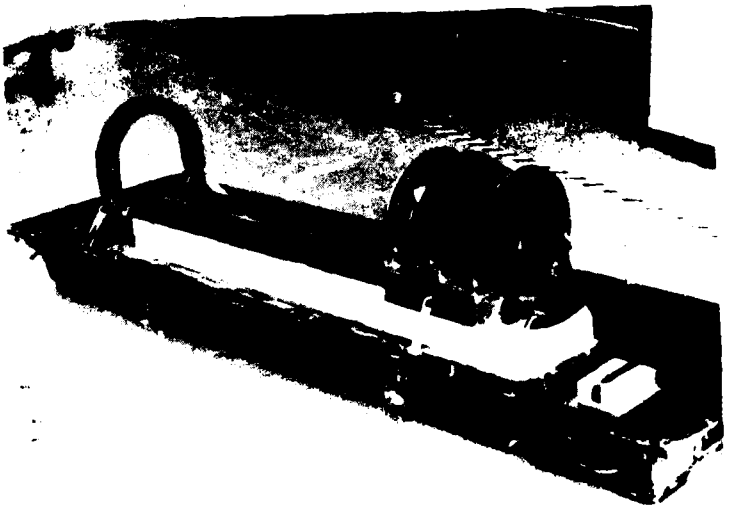


Figure 4, CNU-399/E Maverick Missile Container, Base

Figure 5, Clamp, Forward End View

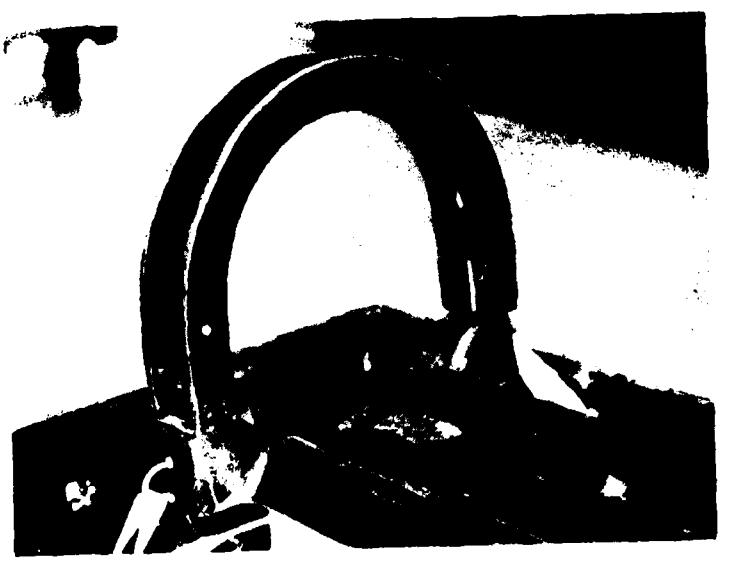


Figure 6, Clamp, Aft End View

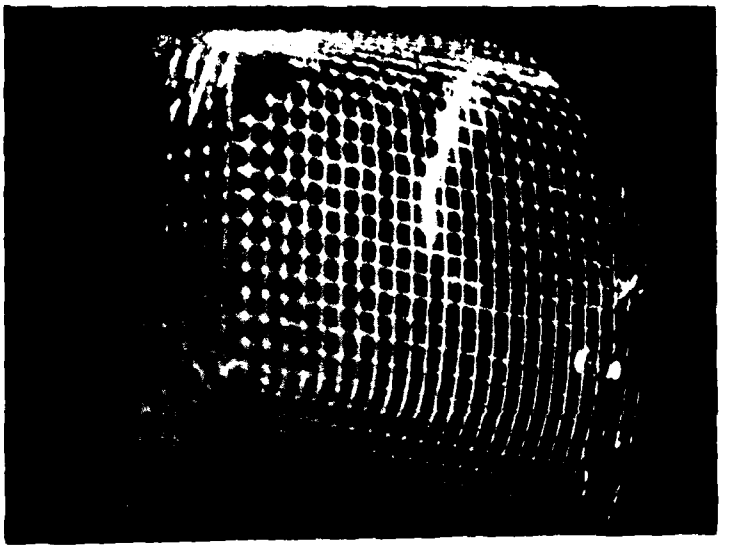


Figure 7, Desiccant Holder

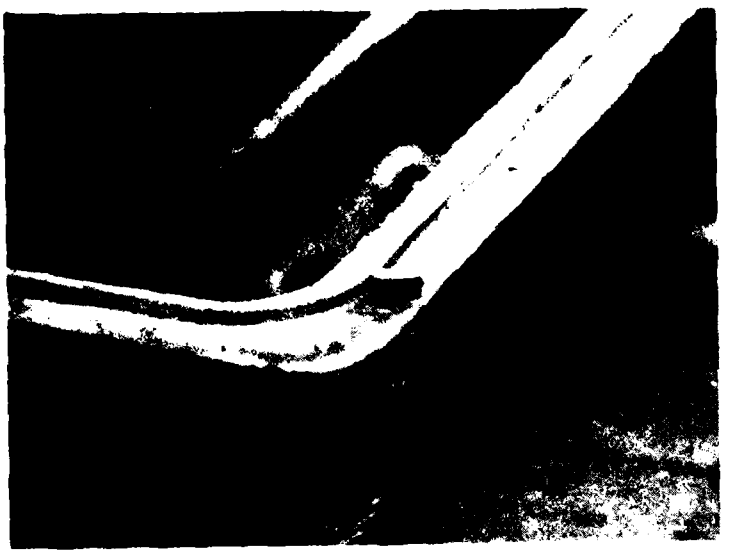


Figure 8, Flange Gasket

Figure 9, Cover Handle

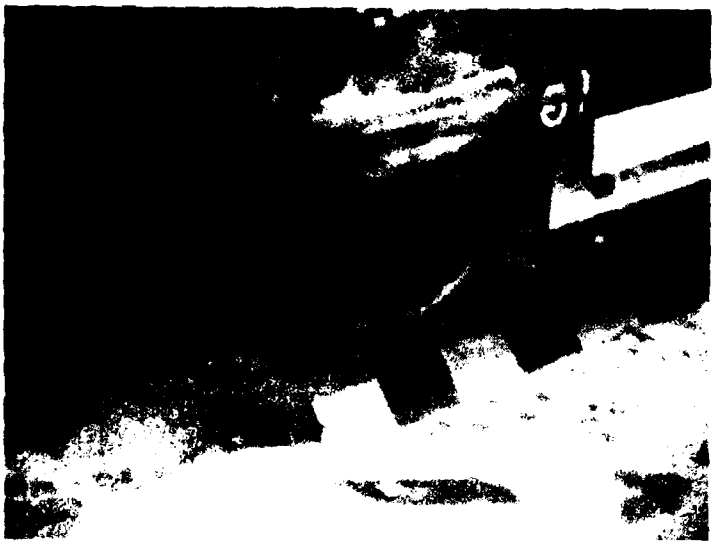


Figure 10, Lift/Tie-Down

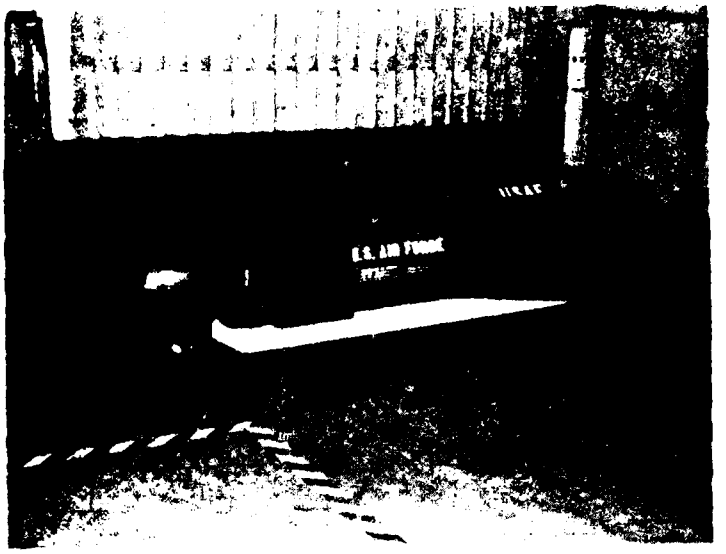


Figure 11, AGM-65/F Inert Maverick Missile 670 Pounds

Figure 12, Cornerwise-Drop Test Damage to Corner No. 8

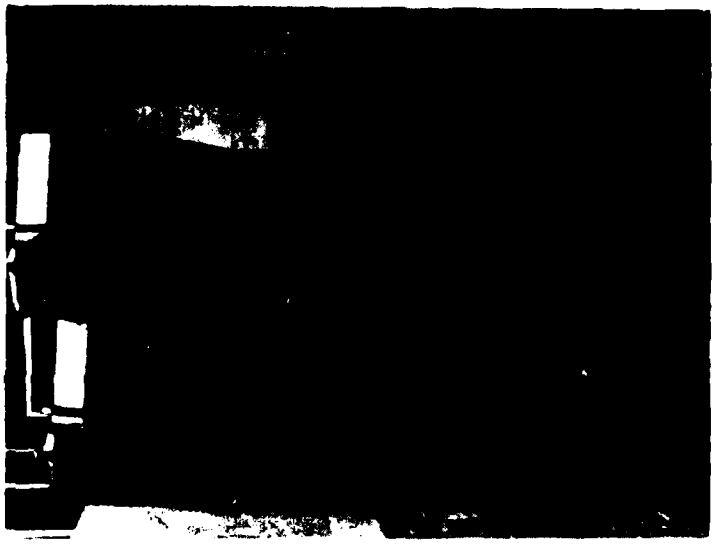


Figure 13, Stacked (2 High) End Pendulum-Impact Test

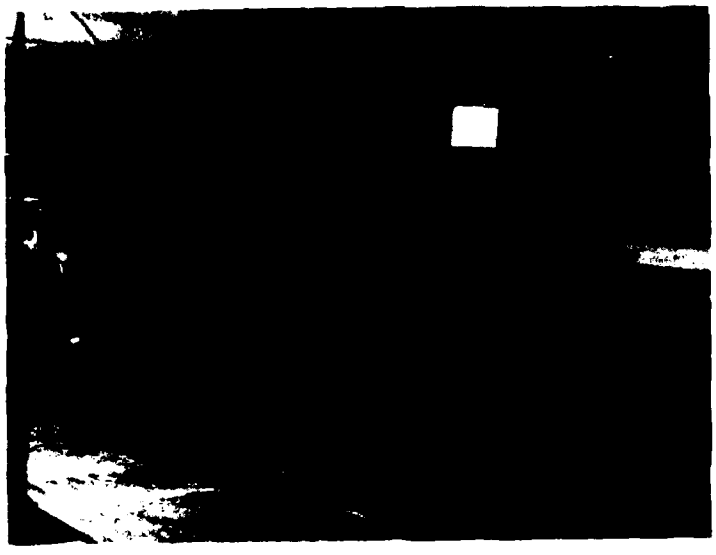


Figure 14, Stacked (2 High) Side Pendulum-Test

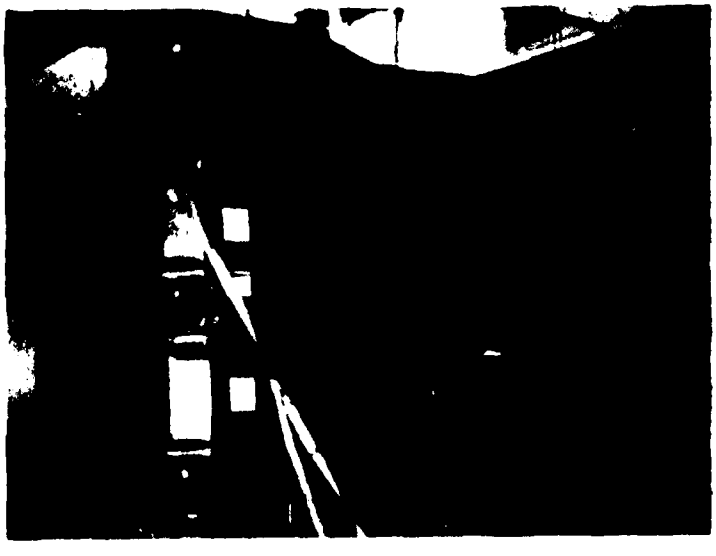


Figure 15, Stacked (3 High) Repetitive Shock Test

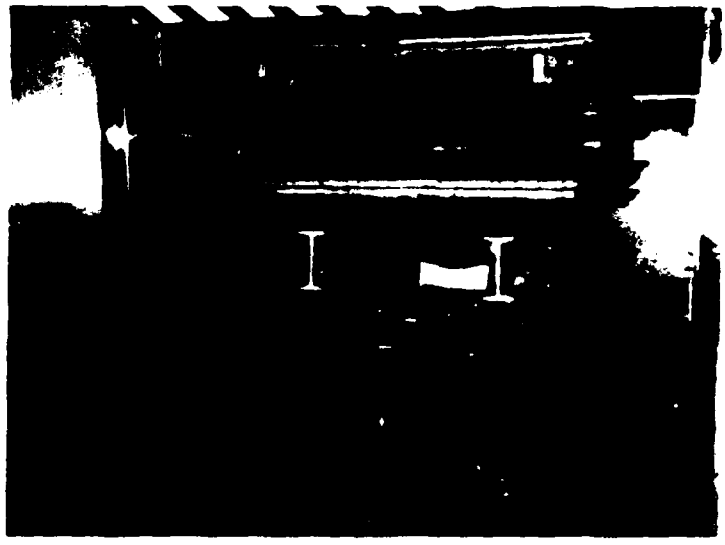


Figure 16, Stacked Superimposed-Load Test, 11,030 Pounds

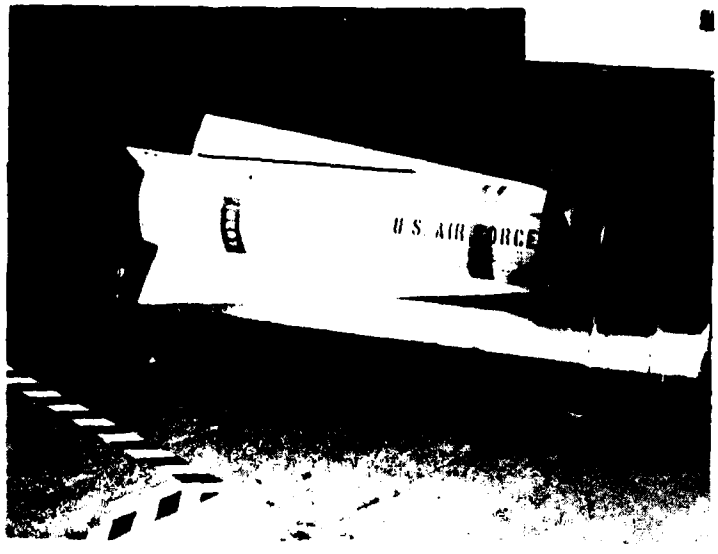


Figure 17, AGM-65A Inert Maverick Missile, 297 Pounds

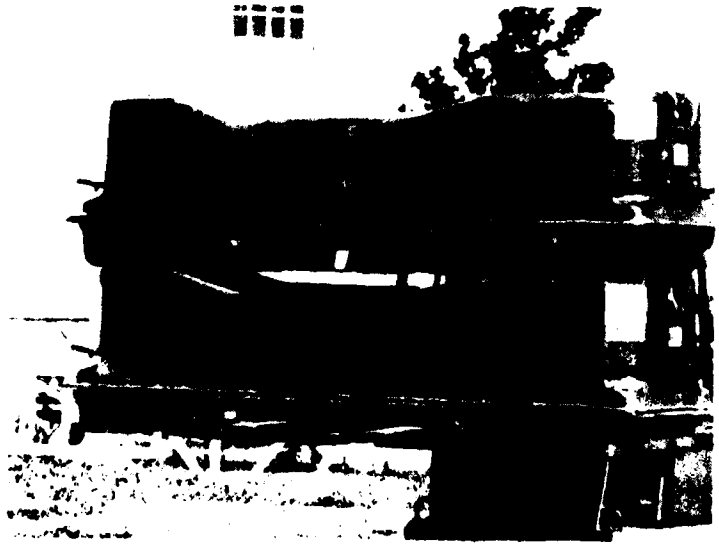


Figure 18, Mechanical Forklift Handling Test, Stacked Two High

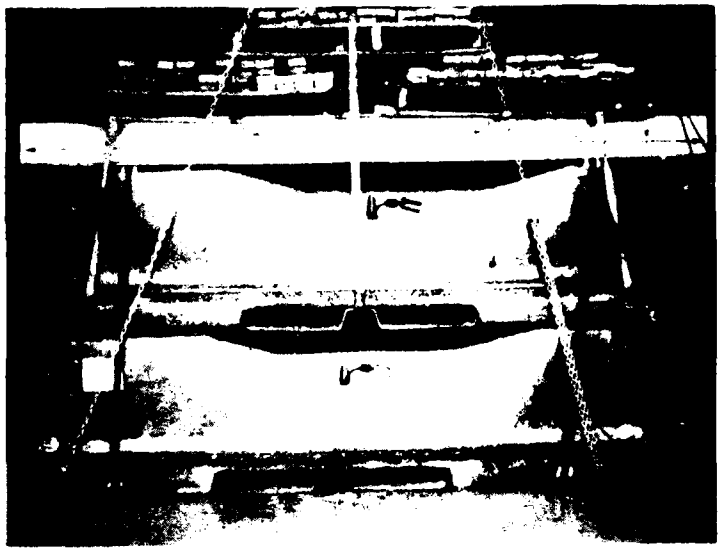


Figure 19, Hoisting Strength Test, 5,400 Pounds All Lifting Points

Figure 20, Fire Resistance Test

Figure 21, Fire Resistance Test

Figure 22, Cover Lift Handle

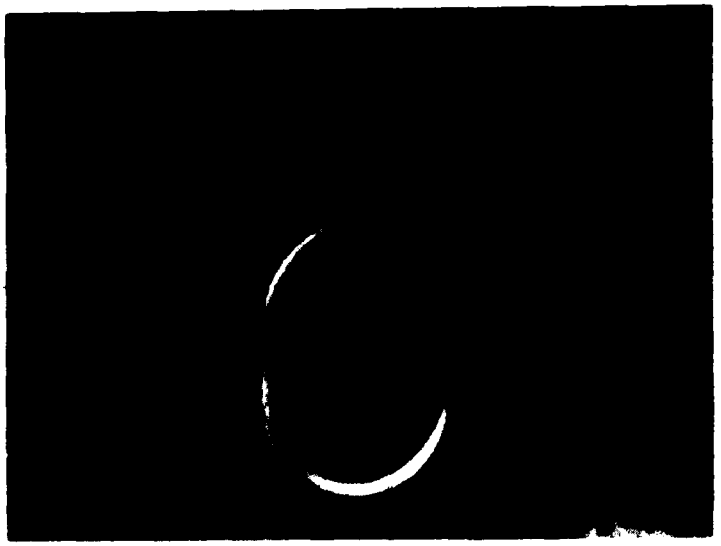


Figure 23, Tie-Down Ring

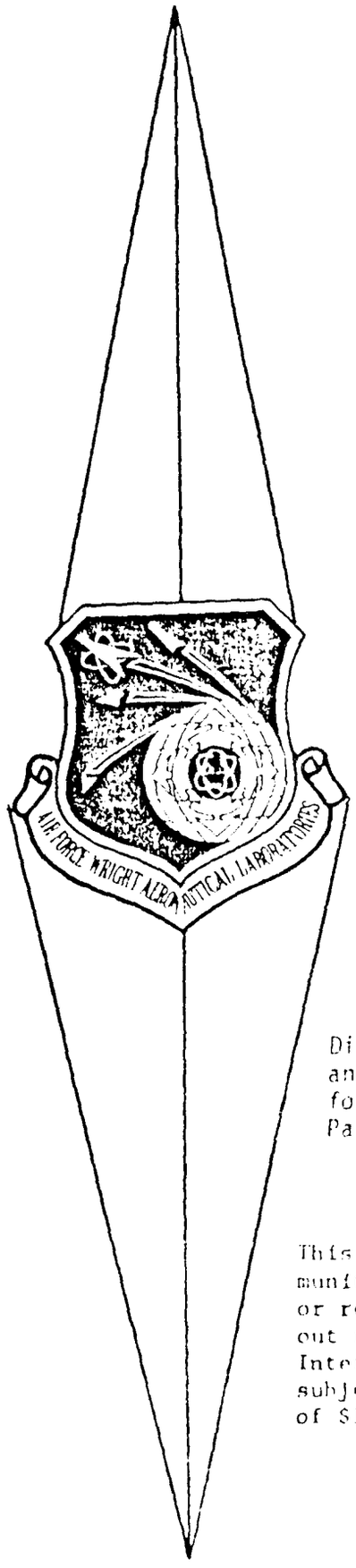
DISTRIBUTION LIST

DTIC/TSR Cameron Station Alexandria VA 22314	2
HQ AFLC/DSTZ Library	20
HQ AFLC/DSTP Wright-Patterson AFB OH 45433-5999	1
HQ USAF/LETT Wash DC 20330	1
OC-ALC/DST Tinker AFB OK 73145	1
OO-ALC/DST Hill AFB UT 84406	1
SA-ALC/DST Kelly AFB TX 78241	1
SM-ALC/DST McClellan AFB CA 95652	1
WR-ALC/DST Robins AFB GA 31098	2
ASD/AWL Wright-Patterson AFB OH 45433	1
DLSIE/DRXMC-D USA Logistics Mgt Cen Ft Lee VA 23801	1
US AMC PACKAGING, STORAGE, AND CONTAINERIZATION CENTER/SDSTO-T Tobyhanna PA 18466	1
US Army Natick Labs/DRDNA-EPS Natick MA 01760	1
NAVSUPSYS COM/SUP-0321/A Wash DC 20376	5
ASD/TEP-A 4030 700 Robbins Ave Philadelphia PA 19111	1

US Army Armament Research & Development Command/DRDAR-TST-S Dover NJ 07801	1
GSA, Office of Engineering Mgt Packaging Division Wash DC 20406	1
HQ DLA/OWO Cameron Station Alexandria VA 22314	1
ASD/ALXP Wright-Patterson AFB OH 45433	2
HQ TAC/LGW Langley AFB VA 23665	2
HQ TAC/DRA Langley AFB VA 23665	2
OO-ALC/MMW Hill AFB UT 84406	2
OO-ALC/MMWR Hill AFB UT 84406	2
Commander Naval Air Systems Command (PMA-242) Wash DC 20361	2
HQ USAF/LEYW Wash DC 20330	2
HQ USAF/RDPV Wash DC 20330	2
HQ AFOTEC/LG4 Kirtland AFB NM 87115	2
AFSC AD/YN Eglin AFB FL 32542	1
HQ AFSC/SDZ Andrews AFB MD 20331	1
HQ AFLC/DS Wright-Patterson AFB OH 45433-5999	2

DISTRIBUTION LIST (Cont'd)

HQ AFCC/MMA Wright-Patterson AFB OH 45433	2
HQ AFLC/DST Wright-Patterson AFB OH 45433	2
AFALC/CV Wright-Patterson AFB OH 45433	2
AFALC/OA Wright-Patterson AFB OH 45433	2
AFLC LOC/CV Wright-Patterson AFB OH 45433	2
AFLC LOC/TL Wright-Patterson AFB OH 45433	2
ASD/TAM Wright-Patterson AFB OH 45433	2
ASD/TAME Wright-Patterson AFB OH 45433	2
AFSC AD/YNEP Eglin AFB FL 32542	2



AFWAL-TM - 85-206-FIBT

MAVERICK MISSILE CONTAINER TIE-DOWN STRNGTH TEST

LT KEVIN M. LANUM
JOHN PAPPAS/KEN LEGER
STRUCTURES TEST BRANCH
STRUCTURES AND DYNAMICS DIVISION

MAY 85

FLIGHT DYNAMICS LABORATORY
AIR FORCE WRIGHT AERONAUTICAL LABORATORIES
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

Atch 1

FOREWARD

This report was prepared by the Structures Test Branch, Structures and Dynamics Division, of the Flight Dynamics Laboratory, Air Force Wright Aeronautical Laboratories, Wright-Patterson Air Force Base, Ohio. It is a formal record of the testing conducted on the CNU-399/E Maverick Missile Container, for the Air Force Packaging Evaluation Agency.

The test program at the Structures Test Branch was directed by Lt Kevin M. Lanum as Project Engineer, and Mr John Pappas and Mr Ken Leger as Instrumentation Engineers. Technical assistance was provided by Mr Richard Harris, A1C Brett Lewis, Mr Mark Pennywitt, and Mr Roy Vance.

This report has been reviewed and is approved for publication.

Sanford Lustig

SANFORD LUSTIG
Chief, Structures Test Branch
Structures and Dynamics Division

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MAVERICK MISSILE CONTAINER TEST REPORT

I. INTRODUCTION

The Air Force Packaging Evaluation Agency requested that a tie-down strength test be performed on the Maverick Missile Container. This test was to consist of applying a static load of 1180 pounds at 45^{o} downward from the horizontal and simultaneously 45^{o} outboard from the container surfaces for one minute. The testing was conducted at the Structures Test Branch on 10 May 1985.

II. TEST SET-UP

A. MECHANICAL

Figure 1 shows the jig that was built to apply the loads. A hydraulic jack capable of applying 7500 pounds of force was connected in series with a load cell at each tie-down location. All four jacks were connected to a single channel of an Edison hydraulic load maintainer to manually control the loads.

The hydraulic jacks were connected at the angles shown in Figure 2 for ease of mounting in the structural steel's existing holes. Vector analysis was used to determine that the desired load equated to 834 pounds in the x, y, and z direction.

B. INSTRUMENTATION

The instrumentation consisted of four load cells. These were Toroid universal two bridge load cells of 2500 pound

CNU-399/E Maverick Missile Container Interim Qualification Test Result

Date Received	Container Serial No. of Set No. 2
27 Dec 84	83-0002

Remarks

1. Incoming visual inspection revealed same as indicated in container serial number 83-0001, 24 Dec 84, subparagraphs 1a, 1b, and 1c.

2. Failed Vacuum Test No. 2. Tee-bolts retorqued to 100 inch pounds, passed vacuum test.

3. Performed Rough Handling Cornerwise/Edgewise Drops, Pendulum-Impact and Stacked Pendulum-Impact tests No. 3a, b, c, and d.

4. Failed Leak Test No. 4 after Rough Handling test.

5. Visual inspection revealed cracks in forward clamp. Also cushion separation at forward clamp area and upper canards rubbing on cover of container.

6. Cannon plug out of cushion.

7. Test discontinued. Container returned to PRC, 14 Jan 85, for additional container design.

capacity and 350 ohm input resistance. Each bridge had three millivolts per volt output. Each cell was hard wired to its own separate bridge balance and power supply module. Bridge voltage was set at 10.0 volts DC.

Output from each load cell was processed on-line using a DEC PDP 11 mini-computer. Data was sampled at 4 samples per second and displayed on a TEC data monitor. Data was recorded on a magnetic tape at one sample per second for hard copy processing. A VAX 11/780 digital computer was used to process the data on the magnetic tape. The accuracy of the load channel was +/- 0.5% of full scale capacity or +/- 12.5 pounds.

III. TEST PROCEDURE

The loads to be applied were judged to be too small to cause failure, which allowed the load components to be applied as previously discussed. An initial load of approximately 1180 pounds for one minute (determined by the lowest of the four load cell readings) was applied , though some of the load components were less than the required 834 pounds, to gain confidence in the tie-down's strength. The load was then increased to approximately 1364 pounds, which brought all components to at least the minimum required force, and held for one minute. The load was then released.

IV. TEST RESULTS AND CONCLUSIONS

As expected, no failure of the tie-downs was experienced.

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 3
14 Feb 85	83-0006

Remarks

1. Performed incoming visual inspection container acceptable.

2. Leak Test No. 2, pass pressure/pass vacuum

3. Performed Rough Handling Cornerwise/Edgewise Drops, Pendulum-Impact and Stacked Pendulum-Impact Tests Nos. 3a, b, c, and d.

4. Failed Leak Test No. 4.

5. Damage to corners of container cover during end Impact Test No. 3d.

6. Cannon plug out of cushion.

7. Testing discontinued. Container returned to PRC, 25 Feb 85, for additional container design.

14 Feb 85	83-0008

1. No testing conducted on container. Returned to PRC, 25 Feb 85, for additional container design.

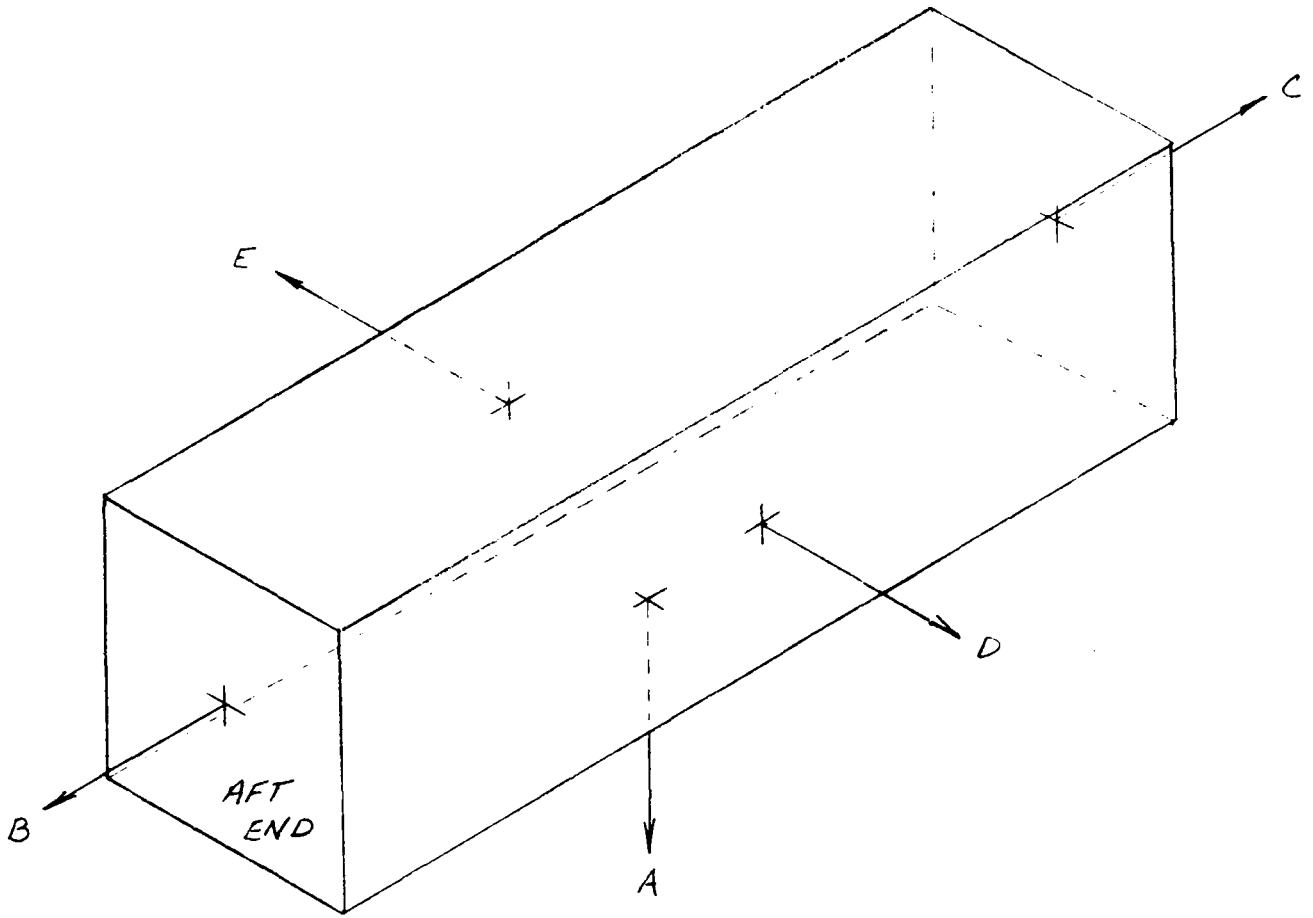

FIGURE 3
RATING DIRECTIONS

Considering that the container weighs 1050 pounds (with missile), our testing has verified that restraining forces can be statically applied to the tie-downs without failure in the directions indicated in Figure 3 and Table 2 as follows:

TABLE 2
MAXIMUM LOAD

Direction	Maximum G's
A	3.51
B	1.63
C	1.81
D	2.02
E	2.01

16 MAY 1985

DST ED/Kovalski/73362/ar/7 May 85

CNU-399/E Maverick Missile Container Interim Qualification Test Results

ASD/TAM

1. Attachment 1 is an interim report on 19 containers received from the contractor, Plastics Research Corporation (PRC) from 5 Oct 84 through 22 Mar 85, at the Air Force Packaging Evaluation Agency.

2. Attachment 2 denotes the modifications made to the containers by PRC.

3. It should be noted that ten of the 19 containers failed the incoming inspection Leak Test No. 2. Six of the ten containers passed the Leak Test No. 2 only after the tee-bolts were retorqued to 100 inch pounds.

4. The qualification testing is assigned a priority 1 and all efforts will be continued to accomplish the work as soon as possible.

FOR THE COMMANDER

/S/ JAMES L. MARBERRY, Colonel, USAF
Director of Transportation
DCS/Distribution

2 Atch
1. Interim Qualification Test Results
2. Modification

Atch 2

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 1
5 Oct 84	83-0001
5 Oct 84	83-0002
25 Oct 84	83-0003
25 Oct 84	83-0004

Remarks

1. Incoming visual inspection revealed:

a. Resin rich areas

b. Upper/lower flange thickness different--flange distorted

c. Cracks at tee-bolt closures--upper/lower flange areas

d. Metal plates at tee-bolt closures distorted--possible over-torque of tee-bolts.

e. Probable continuation of stress cracks in walls of container.

f. Tee-bolt torque low 30 inch pounds, high 170 inch pound

g. Damage to forklift pocket on serial number 83-0002

2. Leak Test No. 2:

83-0001, Pass Pressure/Pass Vacuum
83-0002, Pass Pressure/Fail Vacuum
83-0003, Pass Pressure/Fail Vacuum
83-0004, Fail Pressure/Fail Vacuum

3. Decision made by project office for nondestructive inspection at Materials Laboratory, Bldg 652, Area B, on containers serial numbers 83-0001 and 83-0002. Xray indicated no fiberglass in flange areas.

4. Results of visual inspections indicated need for additional container design, testing discontinued.

5. Containers serial numbers 83-0001, 83-0002, 83-0003, and 83-0004 returned to Plastics Research Corporation (PRC), 7 Nov 84.

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 2
27 Dec 84	83-0001

Remarks

1. Incoming Visual inspection revealed:

   a. Resin rich areas

   b. Metal plates at tee-bolt closures distorted

   c. Upper/lower flanges distorted

2. Leak Test No. 2, Pass Pressure/Pass Vacuum

3. Performed Rough Handling Cornerwise/Edgewise Drops, Pendulum-Impact and Stacked Pendulum-Impact tests Nos. 3a, b, c, and d.

4. After Rough Handling test, failed Leak Test No. 4

5. Visual inspection after test No. 4 revealed:

   a. Leaks at tie-down, also resin cracks

   b. Resin cracks at corners of base

   c. Cracks at stacking points

   d. Cushion separation from base of container

   e. Cushion damage at forward clamp area

   f. Cannon plug out of cushion

6. Test discontinued, container returned to PRC, 14 Jan 85, for additional container design.

CNU-399/E Maverick Missile Container Interim Qualification Test Result

Date Received	Container Serial No. of Set No. 2
27 Dec 84	83-0002

Remarks

1. Incoming visual inspection revealed same as indicated in container serial number 83-0001, 24 Dec 84, subparagraphs 1a, 1b, and 1c.

2. Failed Vacuum Test No. 2. Tee-bolts retorqued to 100 inch pounds, passed vacuum test.

3. Performed Rough Handling Cornerwise/Edgewise Drops, Pendulum-Impact and Stacked Pendulum-Impact tests No. 3a, b, c, and d.

4. Failed Leak Test No. 4 after Rough Handling test.

5. Visual inspection revealed cracks in forward clamp. Also cushion separation at forward clamp area and upper canards rubbing on cover of container.

6. Cannon plug out of cushion.

7. Test discontinued. Container returned to PRC, 14 Jan 85, for additional container design.

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 2
4 Jan 85	83-0003

Remarks

1. Performed visual inspection, container acceptable.

2. Failed Leak Test No. 2, tee-bolts retorqued to 100 inch pounds, passed Pressure/Vacuum test.

3. Saddle modified by PRC, foam replaced with rubber material.

4. All-up round moment of inertia test satisfied pitch, yaw, also C.G. requirements.

5. Cannon plug out of cushion.

6. Test discontinued, container with all-up round returned to PRC, 11 Jan 85, for additional container design.

4 Jan 85 83-0004

1. Performed visual inspection, container acceptable.

2. Leak Test No. 2, pass pressure/pass vacuum.

3. No additional tests conducted, container returned to PRC, 25 Feb 85, for additional container design.

4 Jan 85 83-0005

1. Performed visual inspection, container acceptable.

2. Leak Test No. 2; failed initial test and after retorquing tee-bolts to 100 inch pounds.

3. Initial torque valves low 21 inch pounds, high 100 inch pounds average 70 inch pounds.

4. Container returned to PRC, 14 Jan 85, for additional container design.

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 3
14 Feb 85	83-0006

Remarks

1. Performed incoming visual inspection container acceptable.

2. Leak Test No. 2, pass pressure/pass vacuum

3. Performed Rough Handling Cornerwise/Edgewise Drops, Pendulum-Impact and Stacked Pendulum-Impact Tests Nos. 3a, b, c, and d.

4. Failed Leak Test No. 4.

5. Damage to corners of container cover during end Impact Test No. 3d.

6. Cannon plug out of cushion.

7. Testing discontinued. Container returned to PRC, 25 Feb 85, for additional container design.

14 Feb 85	83-0008

1. No testing conducted on container. Returned to PRC, 25 Feb 85, for additional container design.

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 4
13 Mar 85	83-0010

Remarks

1. Incoming visual inspection indicates better overall manufacturing process, etc..

2. Leak Test No. 2, pass pressure/pass vacuum

3. Performed Rough Handling Cornerwise/Edgewise Drops, Pendulum-Impact and Stacked Pendulum-Ipact Tests Nos. 3a, b, c, and d.

4. Cracks developed on corners of cover of container during Pendulum-Impact Test No. 3d.

5. Passed Leak Test No. 4, Vibration Test No. 5, Repetitive Shock Test No. 7 also, Leak Test No. 6 and 8.

6. Additional cracks developed on corners on cover of container after Test No. 9b, Stacked Superimposed Load test.

7. Resin deterioration noted on cover of the container after 168 hour, +140 degree fahrenheit/90% RH, Test No. 9b.

8. Permanent set of 1/4-inch in height of containr after Test No. 9b.

9. Passed Leak Test No. 10, High Temperature Test No. 11 and Leak Test No. 12.

10. Visual inspection after Test No. 13c revealed failure on bottom of container base.

11. Visual inspection of container interior indicated cushion failure and bent bolt on upper canard and a bent lower fin on the missile.

12. Cannon plug out of cushion.

13. Testing discontinued.

13 Mar 85	83-0011

1. Incoming visual inspection indicates better overall manufacturing process, etc.

2. Leak Test No. 2, pass pressure/pass vacuum

CNU-399/E Maverick Missile Container Interim Qualification Test Results

3. Container used for stacking during Superimposed Load Test on container serial number 83-0010.

Date Received	Container Serial No. of Set No. 4
13 Mar 85	83-0012

1. Incoming visual inspection indicates better overall manufacturing process, etc.

2. Leak test No. 2, pass pressure/pass vacuum after tee-bolts retorqued to 100 inch pounds.

3. Container used for stacking during Superimposed Load Test on container serial number 83-0010.

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 5
29 Mar 85	83-0013

Remarks

1. Performed incoming visual inspection, container acceptable.
2. Leak Test No. 2, Pass Pressure/Pass Vacuum
3. Container to be used for WVTR Test No. 33.
4. Container cover (top surface) concaved 1/2-inch forward end, 3/4-inch aft end.

29 Mar 85 83-0014

1. Performed incoming visual inspection, container acceptable.
2. Leak Test No. 2, Pass Pressure/Pass Vacuum after tee-bolts retorqued to 100 inch pounds.
3. Container to be used for WVTR Test No. 33.

29 Mar 85 83-0015

1. Performed incoming visual inspection, containter acceptable.
2. Leak Test No. 2, Pass Pressure/Pass Vacuum
3. Container to be used for mechanical handling Test No. 21.
4. Container cover (top surface) concaved 5/8-inch forward end, 3/8-inch aft end.

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 6
22 Apr 85	83-0016

Remarks

1. Container passed Leak Test No. 2 after tee-bolts retorqued to 100 inch pounds.

2. Cornerwise drop, 20 inch height, made to test the modified cushion (10 inch length of 4 pound density cushion added to forward and aft ends of the original 2 pound density cushion) result was 66.2Gs.

3. Container upper cushion made contact with terminal accelerometer dynamically stressing the channel 3 connector and thereby generated a very large spurious error response.

4. Tri-axial accelerometer remounted correctly, cornerwise drop made, result was 17.9Gs.

5. Corner damage to base of container at end of second drop of container.

22 Apr 85	83-0017

Remarks

1. Container passed Leak Test No. 2 after tee-bolts retorqued to 100 inch pounds.

2. Cornerwise drop, 20 inch height made to test the modified cushion (5 inch length of 4 pound density cushion added to forward and aft ends of original 2 pound density cushion). Result was 48.8Gs.

3. Container upper cushion made contact with tri-axial accelerometer dynamically stressing the channel 3 connector and thereby generated a very large spurious error response.

4. Tri-axial accelerometer remounted correctly, cornerwise drop made, result was 17.5Gs.

Revised 18 Jul 85

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 7
6 May 85	83-0018

Remarks

1. Incoming visual inspection indicated forklift damage to base, resin-rich areas top and bottom. Top and bottom corners, flange distortion on cover.

2. Leak Test No. 2, pass pressure, pass vacuum after tee-bolts retorqued to 100 inch-pounds.

3. Performed rough handling cornerwise/edgewise drops, pendulum-impact and stacked-impact test Nos. 3a and b, c, and d.

4. Failed Leak Test No. 4 after rough handling test.

5. Visual inspection revealed cracks in corners of cover, and stacking index after pendulum-impact.

6. Test discontinued. Container returned to Plastics Research Corporation, 6 Jun85, for additional container design.

Revised 18 Jul 85

CNU-399/E Maverick Missile Container Interim Qualification Test Results

Date Received	Container Serial No. of Set No. 17
6 May 85	83-0019

Remarks

1. Incoming visual inspection indicated resin-rich areas top and bottom corners. Both cover and base flanges distorted.

2. Leak Test No. 2, pass pressure, pass vacuum after tee-bolts retorqued to 100 inch-pounds.

3. No additional tests conducted, container sent to 355EMS/MAEC, Davis-Monthan AFB AZ, 30 May 85.

CNU-399/E Maverick Missile Container Modifications

Date Received	Date Returned to Contractor	Contractor Serial No.	Set No.	Modifications Made to Containers by Contractor
5 Oct 84	7 Nov 84	83-0001	1	
5 Oct 84	7 Nov 84	83-0002		
25 Oct 84	7 Nov 84	83-0003		
25 Oct 84	7 Nov 84	83-0004		
27 Dec 84	14 Jan 85	83-0001	2	Same as Set No. 1.
27 Dec 84	14 Jan 85	83-0002		The quality of the containers was improved.
4 Jan 85	11 Jan 85	83-0003		Serial No. 83-0003--
4 Jan 85	25 Feb 85	83-0004		Saddle modified by contractor, foam replaced with rubber material.
4 Jan 85	14 Jan 85	83-0005		
14 Feb 85	25 Feb 85	83-0006	3	Contractor Modified
14 Feb 85	25 Feb 85	83-0008		inside corners bottom of container. Work was accomplished at the AFPEA. Tie-down straps for cradle installed. Cushion placed in cover of container.
13 Mar 85		83-0010	4	Container cover stacking
13 Mar 85		83-0011		indexes were modified
13 Mar 85		83-0012		and covers reinforced. Strap tie-down attachment on cradle rotated 90 degrees.
29 Mar 85		83-0013	5	Old Bases and corners
29 Mar 85		83-0014		reinforced with "S"
29 Mar 85		83-0015		glass for additional strength.
22 Apr 85		83-0016	6	Bases and forklift pockets
22 Apr 85		83-0017		reinforced. Cushion on 83-0016 modified with 4 pound density foam 10-inch long on each end. Cushion on 83-0017 modified with 4 pound density foam 5-inch long on each end. Covers from 83-0013 & 83-0014 used for qualification testing with bases 83-0016 and 83-0017.

Revised 18 Jul 85

CNU-399/E Maverick Missile Container Modification

Date Rec'd	Date Rtn'd to Contr	Contractor Serial No.	Set No.	Mod Made to Container By Contractor
6 May 85	6 Jun 85	83-0018	7	Extra tee-bolts added to each side of container (8 total). Cushion modified with 6, 4, and 2 pound density foam. Corners and stacking indexes reinforced.
6 May 85	Sent to: 335EMS/MAEC Davis-Monthan AFB AZ 30 May 85	83-0019	7	Extra tee-bolts added to each side of container (8 total). Cushion modified with 6, 4, and 2 pound density foam. Corners and stacking indexes reinforced.

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